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SOUTHERN CALIFORNIA MARINE SPORT FISHING: PRIVATE-BOAT CATCH AND EFFORT DURING 1981 1/

Box 6

by

Vickie Wine

MARINE RESOURCES REGION

Administrative Report No. 82-7

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SOUTHERN CALIFORNIA MARINE SPORT FISHING: PRIVATE-BOAT CATCH AND EFFORT DURING 1981 [1/]

by

Vickie Wine [2/]

ABSTRACT

An extensive study of fishing activity stemming from privately-owned boats was conducted during 1981 in order to determine the magnitude and impact of this segment of southern California's marine sport fishery. Anglers and divers returning from fishing trips were interviewed at launch ramps, boat hoists, and boat-rental facilities from Pt. Conception to the Mexican border. Information on fishing catch and effort was used to calculate statistical estimates of total catch, total effort, catch of preferred sport fish species, and compliance rates for legal minimum size limits.

An estimated 1,013,000 organisms were landed during 355,000 fishing trips. The major components of this year's catch were 1) Pacific mackerel, *Scomber japonicus*, 231,000 landed; 2) Pacific bonito, *Sarda chiliensis*, 157,000 landed; 3) white croaker, *Genyonemus lineatus*, 148,000 landed; and 4) rockfish, *Sebastes* spp., 142,000 landed. These fishes contributed two-thirds of the total catch.

This year anglers were favored by mild weather and the summertime appearance of migratory game fishes, resulting in higher than usual effort levels and above average catch rates for favored game species.

1/ Marine Resources Region, Administrative Report No. 82-7

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ACKNOWLEDGEMENT

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Nineteen seasonal aids participated in the collection of data for this survey, and I thank each one for his or her contribution to the survey. These people worked long hours on a difficult and complex job, and were all very dedicated biologists.

I also wish to thank Dave Ono and Denyse Racine, who were responsible for all aspects of data collection in the Santa Barbara/Ventura and San Diego areas respectively; and Patricia Wolf, who drew the graphs for this report.

Special thanks go to Ken Hashagen for his help as D-J Project Coordinator.

TABLE OF CONTENTS

LIST OF TABLES

INTRODUCTION

The large population of sport fishermen in southern California exerts heavy fishing pressure on its coastal marine resources. The development of management plans which will protect, conserve, and make use of these resources is imperative, especially in light of the extension of the national fishery conservation zone. In order to determine the impact of one segment of the sport fishery, the California Department of Fish and Game, in cooperation with the National Marine Fisheries Service, studied the catch landed and effort expended by sport fishermen on privately-owned, trailerable boats in southern California marine waters during 1981. The focus of the study was on the number and type of organisms landed, the number of fishermen, the amount of time spent fishing, and the number of sublegal-size organisms landed. This information indicates the magnitude of fishing pressure, the individual species and geographical areas receiving heaviest or lightest fishing pressure, changes in species composition of the catch, and the degree of fishermen's compliance with minimum size-limit regulations.

The information generated by this study provides 1) a baseline study for future comparison of catch and effort trends; 2) evidence for adding, deleting, or changing fishing regulations; 3) an indication of the fishing pressure on various species; and 4) supportive material for other agencies to use when assessing proposed action which could affect southern California's living marine resources. The results of the study focus attention on areas in which management may be necessary.

In 1975 the Department began a study of private-boat sport fishing in southern California, and the results of the 3-year study are presented in Marine Resources Administrative Report Nos. 78-2, 79-3 and 79-11. During the following two years lack of personnel caused temporary cessation of the study. In mid-1980 this constraint was removed and the project

began again. Detailed results and analysis for each 3-month period of the study since 1980 are available in Marine Resources Administrative Report Nos. 81-2, 81-6, 81-8, 82-3, and 82-5.

OPERATIONS

Sampling Plan

Information on fishing activity was collected at randomly selected launch ramps, hoists, and boat-rental facilities from Pt. Conception to the Mexican border, on all weekends and holidays, and on randomly chosen weekdays. Field samplers remained at the sample locations from 1000 to 1800 hr, and an attempt was made to interview all returning anglers and divers. Anglers were asked about the length of the fishing trip, the number of fishing poles used concurrently, and the number of anglers on the boat. Divers were asked about the length of time spent underwater and number of divers on the boat. Specially trained field samplers identified and counted all fishes, mollusks, crustaceans, and echinoderms in the catches. Fishermen who returned without any catch were asked if they had caught any fish which they subsequently returned to the sea. An attempt was made to measure all species with legal minimum size requirements.

Summertime launching activity was so intense at some locations (as many as 190 fishing boats plus uncounted non-fishing boats per sample day) that it was necessary to send two field samplers to those locations instead of just one.

Sampling Locations

Sampling sites were located in Santa Barbara, Ventura, Los Angeles, Orange, and San Diego Counties (Figure 1). During the year we sampled 19 launch ramps, four boat hoists, and four boat-rental locations. One location had both hoist and rental facilities, which we sampled as a single unit.

Santa Barbara and Ventura Counties facilities were sampled from April through December. We were not able to sample these areas during January through March due to lack of trained field personnel.

Launch ramps which were used primarily by sailboat or ski boat enthusiasts, and boat hoists used in conjunction with boat repair facilities or dry storage areas were not sampled. All other launch ramps and hoists were included in the sampling plan, with a few exceptions. Two of the facilities sampled in previous years were dropped from the survey because one was nonfunctional and the other was judged to be physically dangerous for field personnel to work there. Several of the minor boat hoists and rental facilities were sampled for a few months during the summer to determine if private boats were using the facilities. At the end of the summer, those minor hoists and rental facilities which showed extremely low use levels were dropped from the sampling plan.

Statistical Analysis

Estimates and variances for catch and effort were calculated separately for weekends and weekdays. Data were averaged on a daily basis within each sampling unit (a unit is a single county, with the exception of Santa Barbara/Ventura Counties which were combined due to the relatively small amount of data available for each county), then expanded to estimate total catch or effort for the unit during a single month. The annual estimates are sums of the monthly estimates.

Estimates were made for the number of angling parties, angler-trips, angler-trip-hours, diving parties, diver-trips, and diver-hours (an explanation of these terms is given in the Effort section of this paper). Catch estimates were made for landings of 1) all species combined, 2) each of the 20 most commonly caught species, 3) the *Sebastes* genus, and 4) each species which had a legal minimum size limit.

The number of boats which left a sampling area without being interviewed was recorded, providing an adjustment factor for the day's total catch or effort.

All estimates presented here are underestimates because we have no data on fishing trips which ended before 1000 hr or after 1800 hr, nor do we have data from fishermen who purposely evaded our samplers or declined to answer our questions.

RESULTS AND DISCUSSION

During the year 27 launch ramps, boat hoists, and boat-rental facilities were sampled 1,341 times. Samplers interviewed 81,605 anglers and 4,219 divers. These fishermen landed 225,558 fishes, mollusks, crustaceans, and echinoderms of 183 identified species (Tables 1 and 2). They also landed 10,694 filleted fishes whose species could not be determined.

Effort

Of the three types of facilities samples, launch ramps received the heaviest use. Boat hoists were used primarily where launch ramps were unavailable. Skiff rentals not only had a small number of boats for hire, but they could only be used within confined areas and therefore had limited use by fishermen.

Definition of Effort Units

There are two units of angler effort used in this survey. One, the angler-trip-hour, reflects the entire amount of time spent on a fishing trip, not just the time spent angling. Reliable estimates of actual angling time could not be obtained from anglers, but since they could accurately recall the time when they began their trips, the total length of the fishing trip was used as the time measurement from which the effort unit was derived (adjustments were made for those anglers who used more than one fishing pole concurrently). The second unit of effort is the angler-trip (one angler fishing for any amount of time on a single fishing trip). The angler-trip can not, however, be used as a measure of the

population of anglers, since an angler can go on more than one angling trip per year.

The effort units used for divers differ slightly from those for anglers. Scuba divers are usually aware of how much time they spend underwater, since their personal safety is dependent upon this knowledge. Therefore, we used diver hours (an hour of time spent underwater) as the most accurate measure of time spent fishing, and diver-trips (a diver who spent any amount of time underwater on a single diving trip) as the secondary effort unit. The same restriction applies to the diver-trip unit as to the angler-trip unit: it cannot be used as a measure of the number of divers who fished off southern California.

Angler Effort

As a general rule in southern California, angler effort levels and weather conditions are directly related. Effort is low during the winter when storms and rough seas curtail fishing activity. Effort levels gradually rise as spring approaches and weather conditions improve. Activity peaks during the long, warm days of summer, and then a gradual decline in effort sets in during the fall months. Other factors such as the availability of live-bait or the appearance of migratory, favored species can override the correlation between effort and weather.

This year anglers were doubly favored by mild weather and the summertime appearance of migratory game fishes, resulting in higher than usual effort levels throughout most of the year.

An estimated 340,000 angler-trips were taken in southern California marine waters, an increase of 25% over the last time this survey was conducted (1977-78, a bad weather year). Examination of effort levels by county shows that Los Angeles County received the heaviest fishing pressure in the survey area. Over 38% of all private-boat fishing trips began in

Los Angeles County, 28% in San Diego County, 23% in Orange County, and 11% in Santa Barbara/Ventura Counties (excluding all January-March activity because Santa Barbara/Ventura Counties were not sampled during that time).

In most counties angling effort peaked in August when vacationing anglers were out in force, trolling for migratory game fishes (Figure 2). However, angler effort levels in Los Angeles County were at their highest during June through August due to the local availability of large California barracuda, *Sphyraena argentea;* and California halibut, *Paralichthys californicus*. Effort levels throughout the survey area were lowest during December and January.

Diving Effort

The major factors influencing diving activity were ocean conditions and the opening/closing of fishing seasons for abalone, *Haliotis* spp.; and California spiny lobster, *Panulirus interruptus*. Effort levels peaked in October in all counties due to the opening of lobster season, and were at the lowest levels during the winter months when cold water, poor underwater visibility, and the closure of the abalone season made diving an unrewarding experience (Figure 3). After the abalone season reopened and as water temperatures rose, diving effort also increased.

An estimated 16,000 diving-trips were taken off the southern California coast. Approximately 45% of these trips originated in San Diego County, 22% in Los Angeles County, 20% in Santa Barbara/Ventura Counties, and 13% in Orange County. Diving effort was heaviest off San Diego County because this area's offshore habitat is most suitable for the organisms that divers prefer to catch, and weather conditions are generally milder and water temperatures somewhat warmer here than elsewhere in the survey area. Orange County had the least diving effort due to the fact that most of the coastline was legally closed to both sport and commercial abalone fishing, and there is not much rocky habitat suitable to lobsters--a prime target species for divers.

Angler Catch

The angler catch nearly reached the million-fish level this year; an estimated 963,000 fishes were landed. Major contributors to the catch were Pacific mackerel, *Scomber japonicus*, 231,000 landed; Pacific bonito, *Sarda chiliensis*, 157,000 landed; white croaker, *Genyonemus lineatus*, 148,000 landed; and rockfish, *Sebastes* spp., 142,000 landed. These fishes made up two-thirds of the total catch (Tables 3 and 4).

Anglers were very pleased by this year's availability of favored game species such as halibut, 10,000 landed; barracuda, 8,500 landed; and bass, *Paralabrax* spp., 120,000 landed. Of primary importance to the "big game fishermen" were the appearances of yellowtail, *Seriola dorsalis*, 8,000 landed; and albacore, *Thunnus alalunga*, 2,500 landed. Even a few striped marlin, *Tetrapterus audax*, were taken off San Diego and Orange Counties (approximately 32).

Several species uncommon to southern California waters appeared in sampled catches. These species are generally found in more southern latitudes. Over 40 finescale triggerfish, *Balistes polylepis*; 15 dolphinfish, *Coryphaena hippurus*; seven sicklefin smoothhound, *Mustelus lunatus*; and two smooth hammerhead sharks, *Sphyrna zygaena*; were taken in southern California's inshore area. Two fish of the *Tilapia* genus (a South African freshwater fish) made their way into the ocean catch from illegally transplanted stocks located in Los Angeles/Orange County drainage channels. There was also a member of the rockfish family, Scorpaenidae, which we have as yet been unable to identify.

Seasonal Variations

Throughout the year the majority of the catch was made up of three species: Pacific mackerel, bonito, and white croaker. These fishes contributed a constant 50-60% of the catch. Rockfishes also formed a basic part of the catch throughout the year, contributing 12-14% during spring and summer,

and 18% during fall and winter. The catch of bass peaked during the spring months (24%), and remained a major contributor to the catch (10%) during summer and winter.

There is a group of species referred to in this paper as favored game fishes. This group includes albacore; bass; barracuda; halibut; marlin; white seabass, *Atractoscion nobilis;* and yellowtail. Half of these species are not permanent residents of California waters, and thus are available to local fishermen only after migrating into the area. The appearance of these particular fishes in the southern California area is neither cyclic nor predictable. The remaining species reside in southern California's coastal area year-round, although they may not be available to the fishery at all times of the year. This year anglers were very pleased by the local appearance and availability of favored game species. These fishes contributed nearly 25% of the spring catch, resulting in a large population of very happy anglers. During the rest of the year the favored game fishes made up 7-13% of the catch.

Location Variations

Differences between each county's catch composition (Table 7, Figures 4-8), can be tied directly to water temperature, type of offshore habitat, and anglers' preferences for certain species.

In Santa Barbara/Ventura Counties low water temperatures kept many of the favored game species out of the area. Rockfishes were the mainstay of the fishery (41%; 51,000 landed), although white croaker and Pacific mackerel also contributed substantially to the catch (29%; 36,000 landed). Summer anglers were kept happy by frequent catches of kelp bass, P. clathratus (8%; 10,000 landed). Other than bass, very few favored game fishes were landed.

Two-thirds (66%; 306,000 landed) of the Los Angeles County catch was composed of Pacific mackerel, white croaker, and bonito. These are surface

fishes which were generally available at all times of the year. Beginning in late winter and continuing through late summer, a sucoession of favored game species appeared in the catches. Good catches of halibut in Santa Monica Bay during February, March, and April were followed by an abundance of large barracuda off Long Beach, which continued through July. Before the barracuda bite slacked off, bass began to contribute heavily to the catch, and in July and August, yellowtail appeared in the catch. An estimated 45,000 favored game fishes were landed in Los Angeles County.

The top species in Orange County's catch were Pacific mackerel and bonito (54% of the catch; 84,000 landed). Bass and white croaker also made up a large segment of the catch (24%; 37,000 landed). Rockfishes contributed only a small part (6%; 10,000 landed) because there is not much rockfish habitat in Orange County's nearshore area. A few of the favored game fishes other than bass appeared in the catch, and Orange County was the northernmost area to record catches of albacore and marlin.

In San Diego County favored game fishes were the primary target species throughout the summer and early fall months. Albacore, marlin, and yellowtail were highly sought after. An estimated 2,500 albacore, 6,500 yellowtail, and approximately 14 striped marlin were landed. More bass were landed here than anywhere else in the survey area (24% of San Diego County's catch; 52,500 landed); and this was the only county where spotted sand bass, *P. maculatofasciatus*, were landed frequently. Pacific mackerel was the most commonly landed single species (20%; 44,000 landed), followed by bonito (11%; 25,000 landed).

The catches landed at individual sample locations varied depending on the type of offshore habitat and the kinds of fishes which were target species for the area. The most frequently landed species at each sample location reflected both these factors (see Appendix).

Changes in Species Composition

There have been some distinct changes in species composition of the catch since this project started in 1975. The most obvious change has been in the catch of Pacific mackerel. In 1975-77 this species made up only 4% (36,000 fish) of the catch. Beginning in 1978 the catch rate began rising, and this year Pacific mackerel represented 24% (231,000 fish) of the catch. In recent years the Pacific mackerel resource was considered "depressed", and the Department recommended a moratorium on commercial fishing of this species until the resource was again abundant. The resource recovered under this protected status and became the most commonly landed species in the private-boat angler catch during 1981.

When the project began, white croaker was the most commonly landed species and contributed 25% (238,000 fish) of the catch. It was nudged out of its number one position this year by Pacific mackerel, and contributed 15% (148,000 fish) of the catch. This is not necessarily a reflection of a decrease in population size of white croaker. Instead, it is probably due to anglers changing their preferences from this species to the increasingly abundant Pacific mackerel.

Landings of Pacific bonito have been extremely variable throughout the survey, contributing between 3% and 16% of the catch (annual landings of 19,000 - 157,000 fish). This variability can be tied to the presence or absence of warm water off southern California. During "warm water years" young bonito migrate from Baja California into southern California offshore areas and become favored catches of many local fishermen. During 1981 warm water was present, and the bonito catch rate was at its highest point in the survey.

Although the number of bass landed each year fluctuated between 82,000 and 120,000 fishes, the relative proportion of the catch remained stable at 11%. The number of bass landed seemed to be related to the amount of fishing effort expended rather than changes in abundance of the bass population.

The proportion of rockfish in the catch remained constant (29%) during 1975–78. However, 1981 rockfish landings decreased to 15% of the angler catch due to anglers' preference for the more favored species which were available during much of the year. Many anglers tended to consider rockfish as secondary target species, and fished for them only when other, more highly preferred species were unavailable.

Diver Catch

Divers landed an estimated 51,000 organisms. Major components of the catch were abalone, 19,000 landed; rock scallop, *Hinnites multirugosus*, 9,500; California sheephead, *Semicossyphus pulcher*, 6,000; and lobster, 4,000. These species made up 75% of the diver catch (Tables 5 and 6).

Seasonal Variations

Seasonal variations in the diver catch were primarily a function of fishing regulations which allowed abalone and lobster to be taken only at certain times of the year. During October, when the fishing season for lobster opened, lobster made up the majority of the diver catch. In spring and summer, when abalone season was open and lobster season closed, abalone contributed the majority of the catch. In late fall and winter, although both lobster and abalone were legally available, poor underwater visibility prevented divers from finding them.

Location Variations

Divers in Santa Barbara/Ventura Counties landed an estimated 12,300 organisms, over half of which were abalone and rock scallop. In the abalone catch the primary species was red abalone, *Haliotis rufescens*. Landings of lobster were similar to landings in previous years.

In Los Angeles County a large portion of the coastline was closed to both commercial and sport fishing for abalone, so divers directed their efforts towards rock scallop, lobster, and sheephead. Total estimated landings for Los Angeles County were 12,400 organisms.

Most of Orange County's coastline, like that of Los Angeles County, was closed to abalone fishing. Most divers in this area searched for rock scallop and sheephead. A few landings of abalone (mostly green abalone, *H. fulgens*) were reported. Total landings for Orange County were the lowest in the survey area (6,000 organisms).

The diver catch in San Diego County was the greatest of all surveyed counties (20,000 organisms). Red abalone was the most common species in the catch, followed by sheephead and green abalone. Landings of lobster and rock scallop were very low, however.

Fishing Success

There are a great number of motivational forces behind fishing trips. The primary reason is, naturally, to catch fish. Many sportsmen are concerned mainly with the challenge of seeking, playing, and landing a fish. Others wish to catch fish for the purpose of consumption. But for some, catching fish is not the main reason for getting into a boat and cruising along the coast: these people want fresh air, relaxation, camaraderie, a change of scenery, or an escape from business or familial pressures. Fishing success cannot be measured for those fishermen seeking something other than tangible rewards. However, if we define fishing success as catching at least one fish, we can then use the data gathered during this survey to determine success rates among fishermen.

In this survey we differentiated between those fishing parties (one or more fishermen on a single boat) who caught nothing at all, and those who caught fish but chose not to keep the fish, subsequently returning them to the sea or giving them away before arriving at the launch ramp. Thus we have three categories of fishing parties, those who 1) had no catch, 2) discarded their catch, or 3) kept their catch.

In the five counties surveyed only 11.5% of the fishing parties had

no catch at all, and 21.8% were successful but discarded their catch. This means that two out of every three private-boat fishing parties in southern California took fish home with them after a fishing expedition.

The highest proportion of successful fishing parties occurred in Santa Barbara, Ventura, and Los Angeles Counties (Table 8). Over 90% of all fishing parties in these counties caught fish, and 16-21% chose not to keep their fish.

Orange County had the highest rate of unsuccessful fishing trips (15%), and it also had the highest rate of discarded catches (28%). Part of this can be explained by the fact that Orange County fishermen tended to fish for particular species and discarded anything else they caught.

In San Diego County the rate of unsuccessful parties was 12%, which is partly attributable to the large number of fishermen who trolled unsuccessfully for big game fishes. About 20% of the fishing parties discarded their catches, and the remaining 68% kept their fish.

Size Limit Compliance

Examination of the length measurements taken on all size-regulated species shows that angler compliance with legal minimum size limits was highly variable, depending upon the species (Table 9, Figures 9-17). At the low end of the scale was the compliance rate for white seabass: only 16% of all fish measured were legal size. Three factors which account for the high incidence of "short" white seabass in the catch are anglers' 1) inability to identify white seabass, 2) unfamiliarity with the legal size limit, and 3) reticence to return a relatively large fish (12-27 even though it has not yet reached legal size (28 in.).

The next lowest compliance rate was for barracuda; 59% of all barracuda were legal size. An abundance of legal-size fish were available to Los Angeles County anglers, with the result that the compliance rate for this county was high. However, elsewhere in the survey area barracuda

were not as abundant, and anglers tended to keep whatever they caught--regardless of size--because they felt they wouldn't be able to catch another.

The percentage of legal-size halibut landed was higher than in previous years. During the first 3 years of this survey, halibut averaged 58% legals. This year we recorded 71% legal-size fish.

A size limit (22 in.) for lingcod, *Ophiodon elongatus*, went into effect this year, and 70% of all lingcod measured were larger than the minimum size. Prior to the time when the size limit went into effect, only 47% of the lingcod landed by private-boat sport fishermen were larger than 22 inches.

The best angler compliance rate was for the three bass species, averaging 88% legal-size fish. The annual percentage of legal-size bass has risen gradually during this project's history, from 84 to 88%. This could be due to several factors such as a greater availability of legal-size fish, increased angler awareness of the size limit, increased angler willingness to comply with the regulations, or an increased tendency of anglers to hide sublegal-size fish from our samplers. However, our samplers have interviewed over 250,000 anglers since the beginning of this survey and have taught fish identification and sport fishing regulations to all who would listen; therefore, I feel that anglers have thus become better acquainted with the 12-inch bass size limit and are demonstrating better compliance.

Compliance rates were much higher for those species taken primarily by divers. Abalone averaged 96% legals, and 98% of all lobster measured were legal size. Divers seem to be much better educated than anglers about the fishing regulations.

SUMMARY

Throughout 1981 a study of the catch and effort of saltwater fishermen aboard privately-owned boats was conducted in southern California. The

purpose was to determine the magnitude of fishing pressure, the individual species and geographical areas receiving lightest or heaviest fishing pressure, changes in species composition of the catch, and the degree of fishermen's compliance with minimum size-limit regulations. The results of the study focus attention on potential or already existing problems in southern California's marine recreational fisheries.

Data were collected by interviewing fishermen at the end of a fishing trip, when they returned to a boat-launching facility. The fishermen were asked about the amount of time spent on or in the water, and their catches were identified, counted, and measured. From this data, estimates were calculated for total effort, total catch, and catches of certain species.

An estimated 340,000 angling trips and 16,000 diving trips were taken during the year. Angling effort levels were higher than usual due to mild weather during most of the year, and to the availability of favored game species during spring and summer. The heaviest fishing pressure by anglers occurred off Los Angeles County, while the heaviest diving activity occurred off San Diego County.

Samplers identified 165 species in the angler catch, but over half the catch was composed of three major species: Pacific mackerel, Pacific bonito, and white croaker. Favored game species such as California halibut, California barracuda, bass, yellowtail, and albacore were more abundant than in previous years, and comprised 15% of the angler catch.

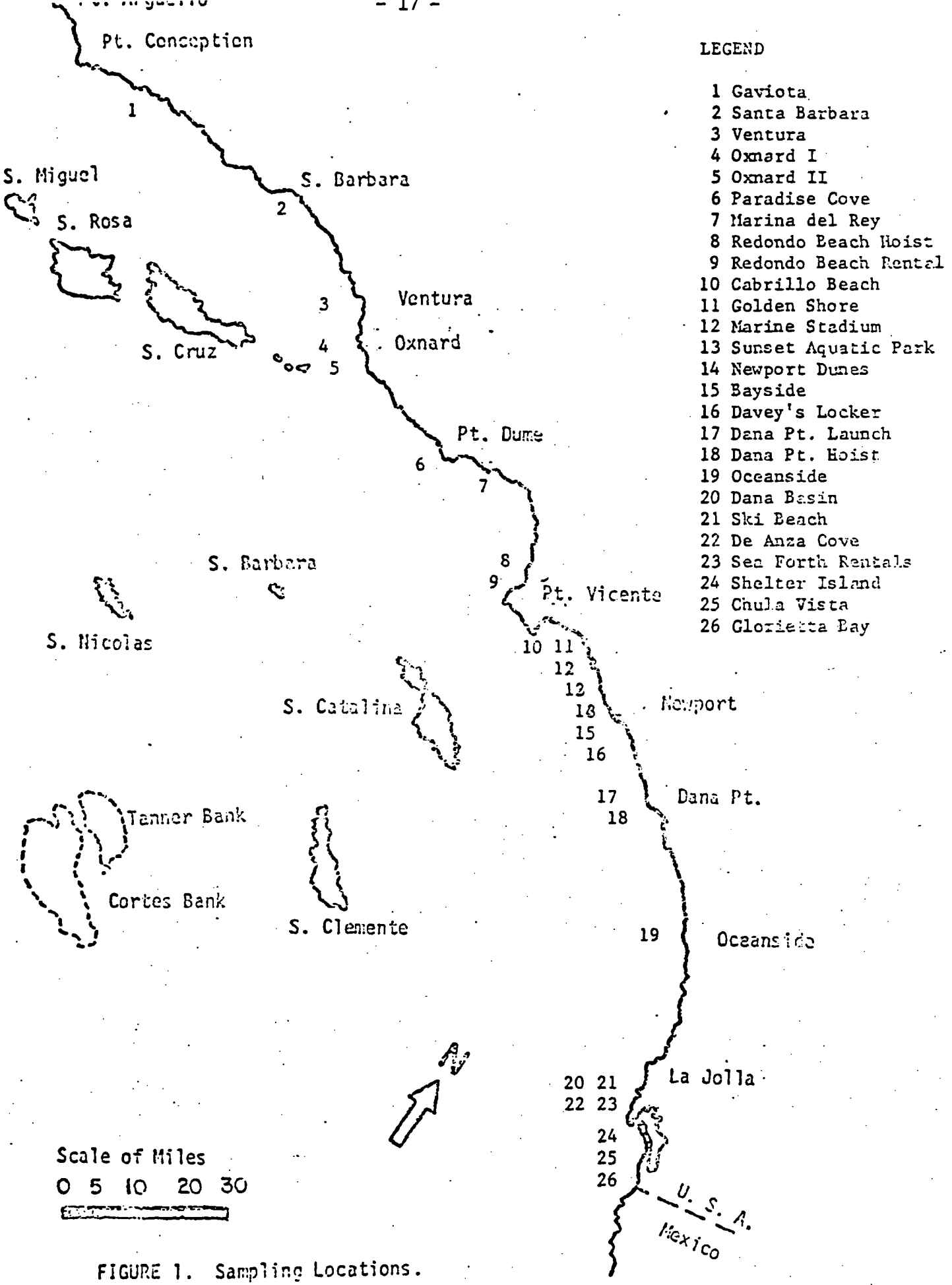
There were several changes in the species composition of this year's angler catch compared to catches for previous years. The most obvious change was for the most commonly landed species: white croaker was replaced by Pacific mackerel. This was due to a very large increase in the Pacific mackerel population. Pacific bonito landings have been extremely variable during the survey, depending primarily on the absence or presence of warm water off southern California. Landings of big game fishes have

also varied due mostly to environmental factors. Rockfish landings varied inversely with landings of surface fishes because many anglers sought rockfish only when other fishes became unavailable.

Divers landed an estimated 51,000 organisms, of which red abalone, rock scallop, and California sheephead formed the major part.

Only 11.5% of all fishing parties returned without having caught any fish, although another 22% caught fish but chose not to keep them. This means that two out of every three private-boat fishing parties took fish home with them.

Compliance rates for minimum size-limit regulations were variable. Divers paid close attention to the size limits, landing 96% legal abalone and 98% legal lobster. However, angler compliance rates were not nearly as good. Their best compliance rate was for bass, 88%. About 70% of all lingcod landed were legal size. Anglers were obviously aware of the new lingcod size-limit regulation which became effective this year, because prior to this time only 47% of the lingcod landed were larger than the current minimum size. Landings of legal-size halibut rose from 58% in previous years to 71% this year, but the compliance rate for barracuda remained low, 59%. The worst compliance rate was for white seabass, 16%, because most anglers could not identify a white seabass, nor were they aware that a size limit exists for this fish.



LEGEND

1 Gaviota
2 Santa Barbara
3 Ventura
4 Oxnard I
5 Oxnard II
6 Paradise Cove
7 Marina del Rey
8 Redondo Beach Hoist
9 Redondo Beach Rental
10 Cabrillo Beach
11 Golden Shore
12 Marine Stadium
13 Sunset Aquatic Park
14 Newport Dunes
15 Bayside
16 Davey's Locker
17 Dana Pt. Launch
18 Dana Pt. Hoist
19 Oceanside
20 Dana Basin
21 Ski Beach
22 De Anza Cove
23 Sea Forth Rentals
24 Shelter Island
25 Chula Vista
26 Glorietta Bay

FIGURE 1. Sampling Locations.

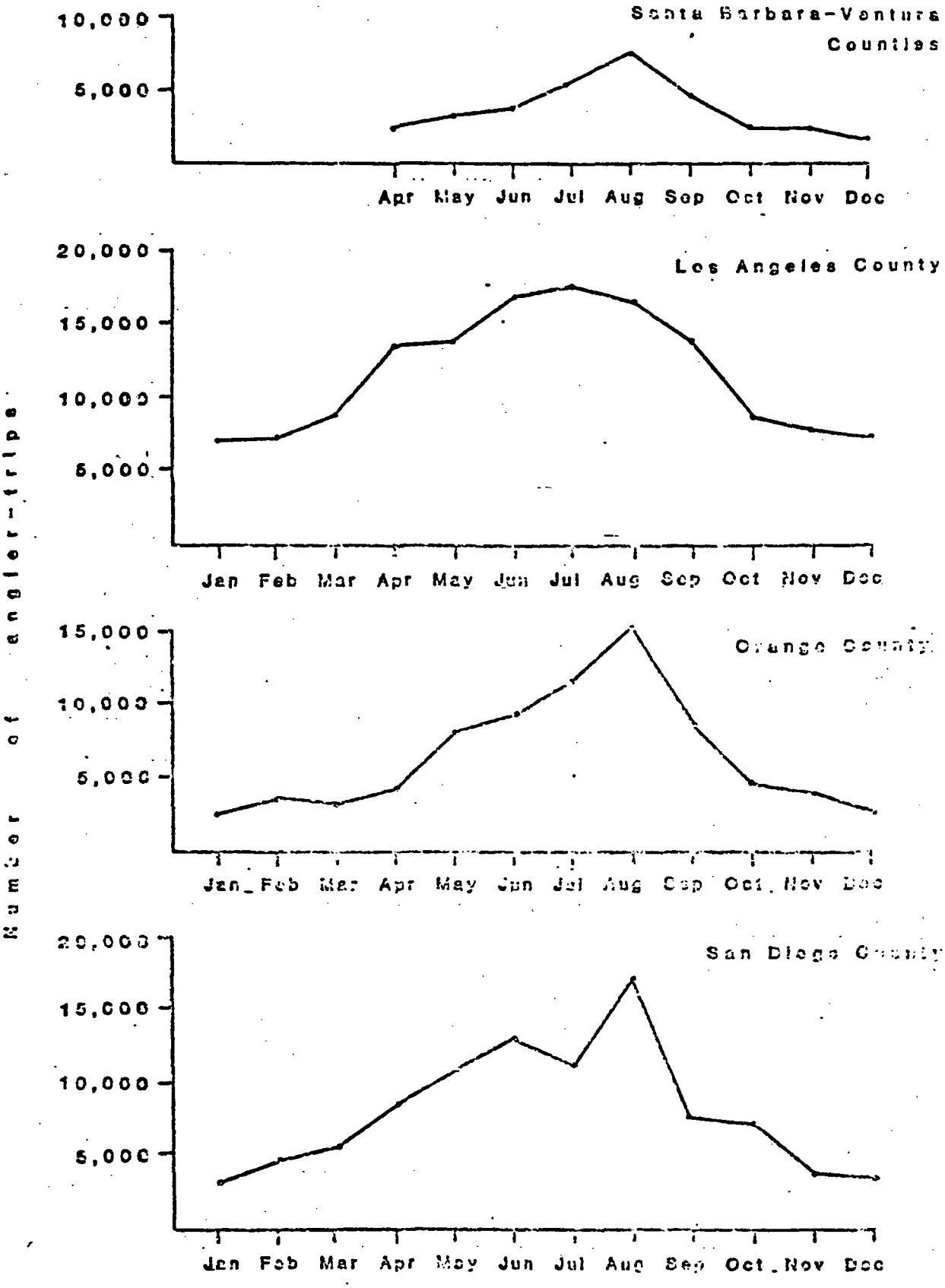


FIGURE 2. Estimated angler effort, January-December, 1981.

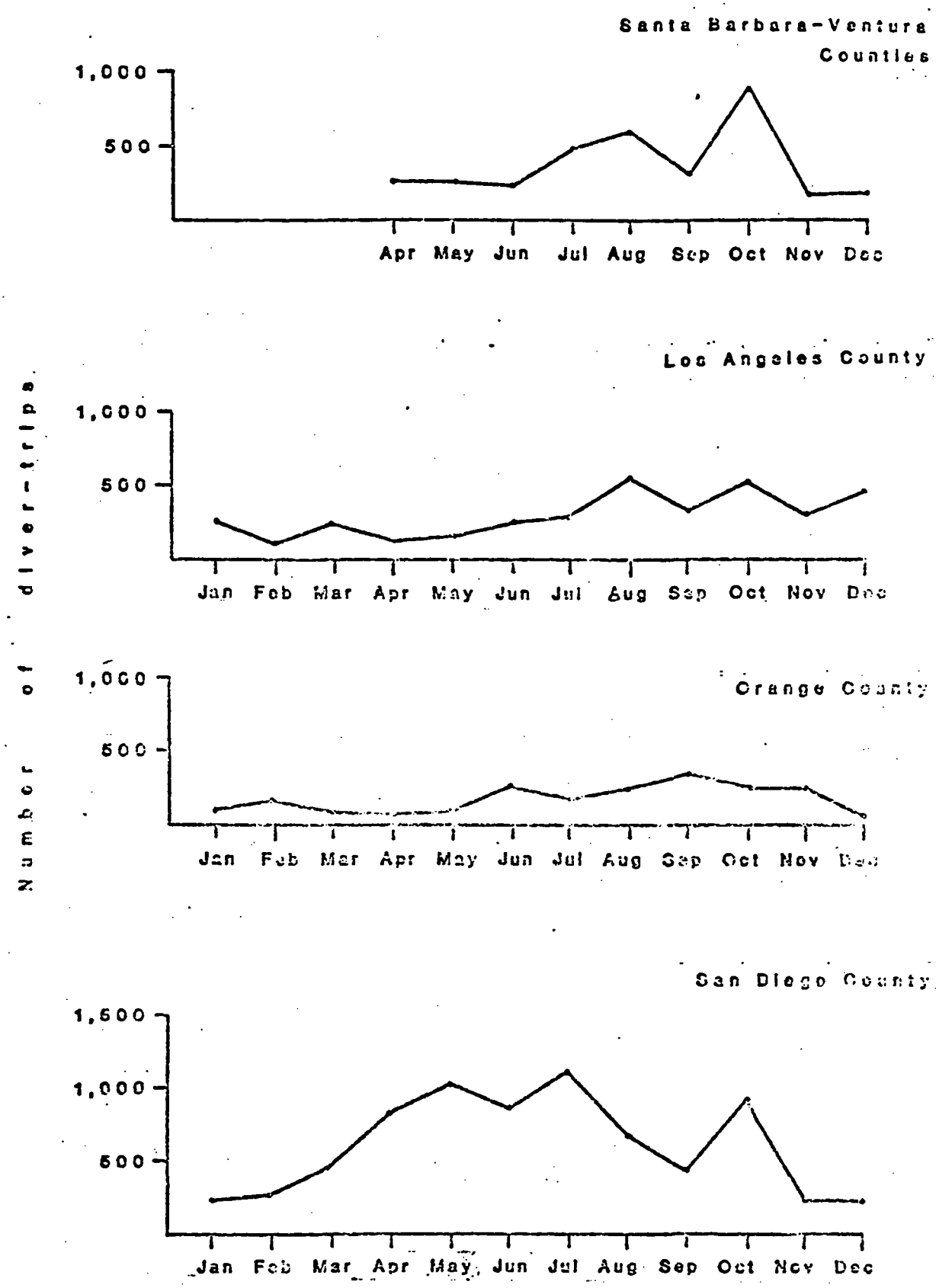
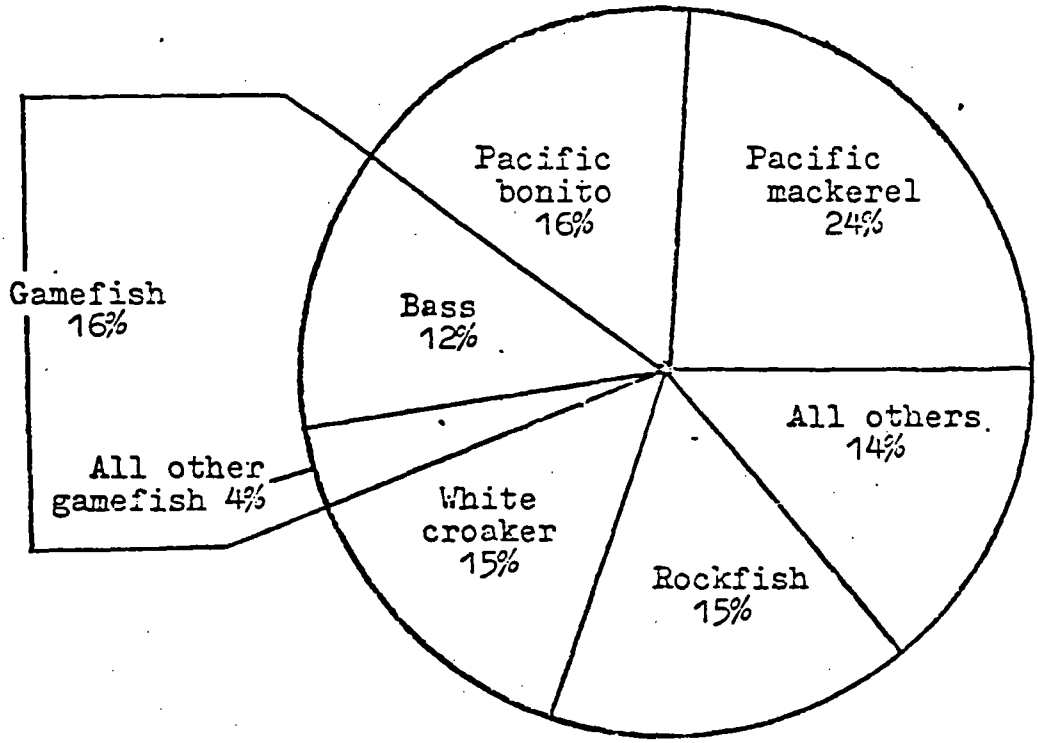
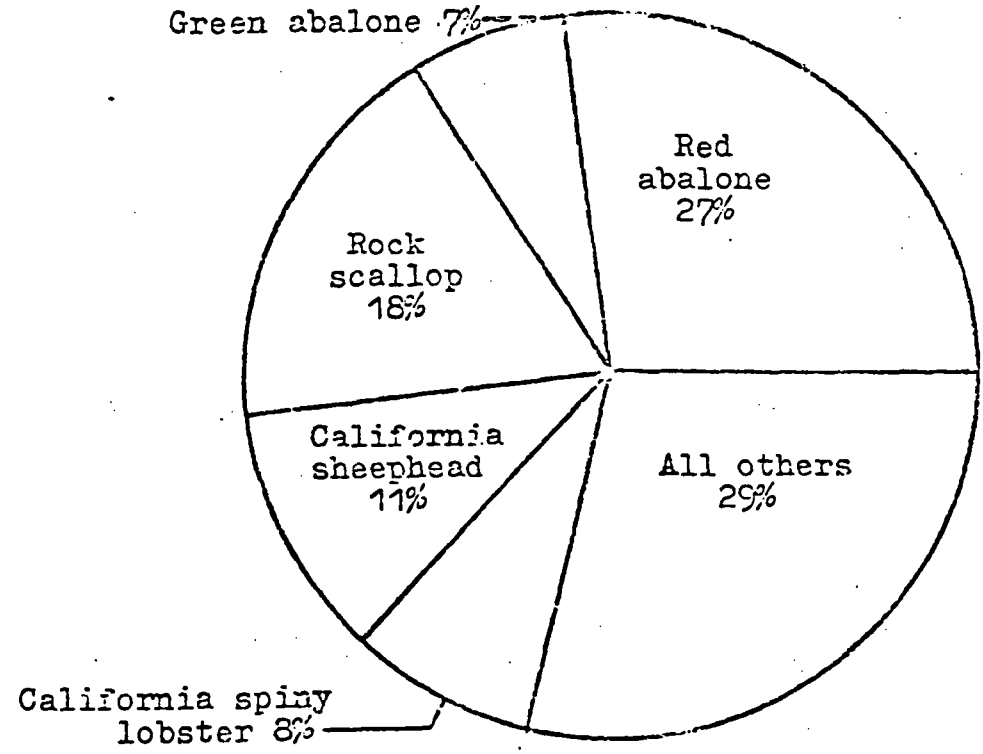


FIGURE 3. Estimated diver effort, January-December, 1981.

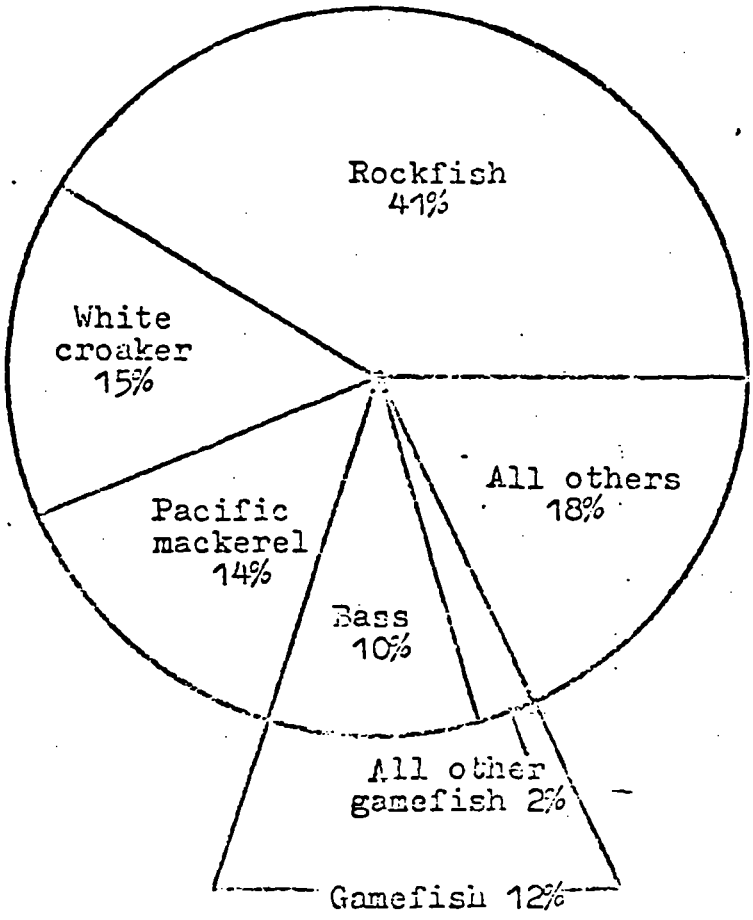


ANGLER CATCH

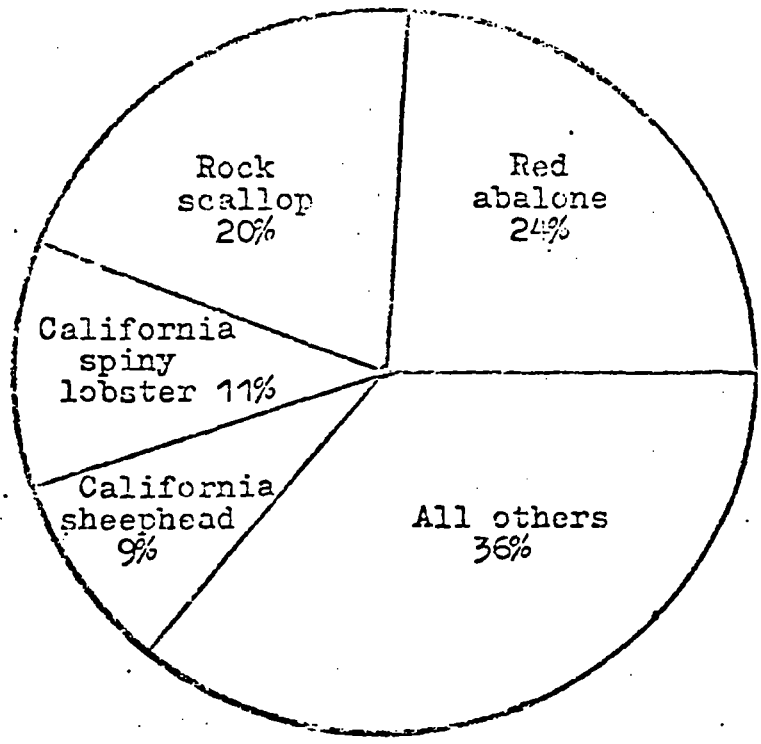


DIVER CATCH

FIGURE 4. Species composition of angler and diver catches, all counties combined.

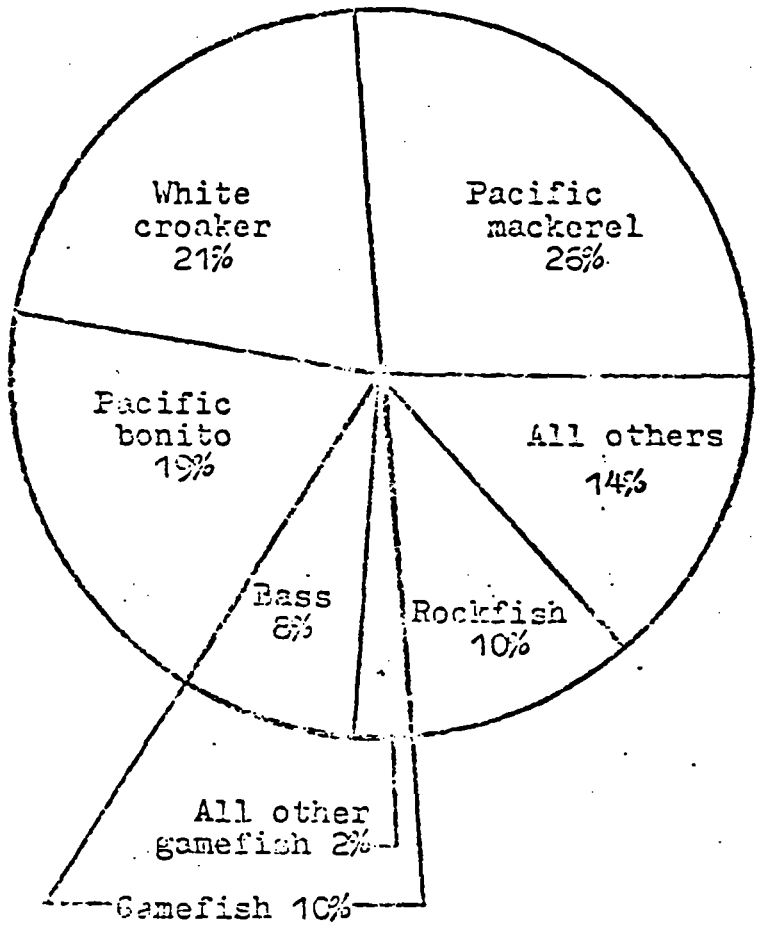


ANGLER CATCH

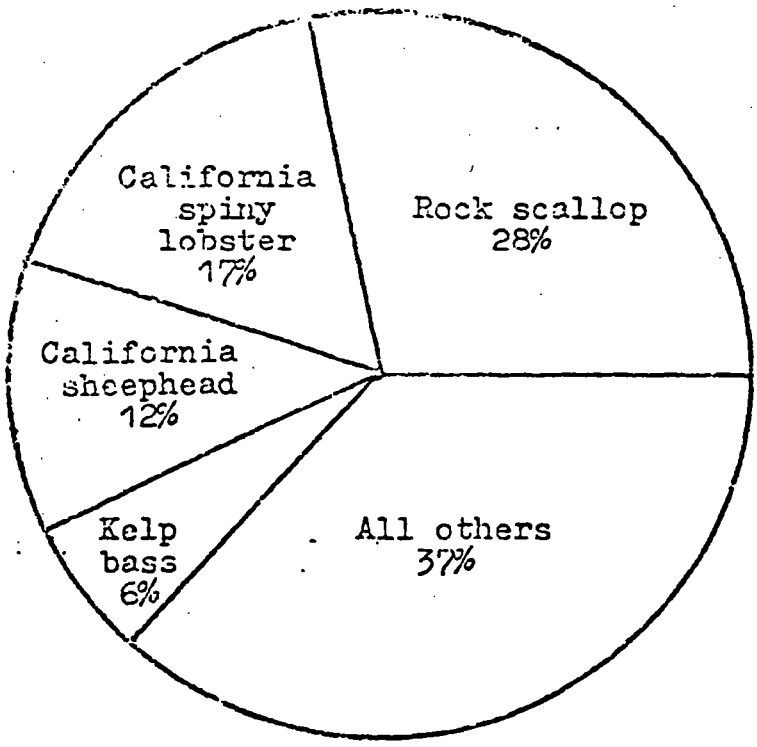


DIVER CATCH

FIGURE 5. Species composition of angler and diver catches, Santa Barbara/Ventura counties.

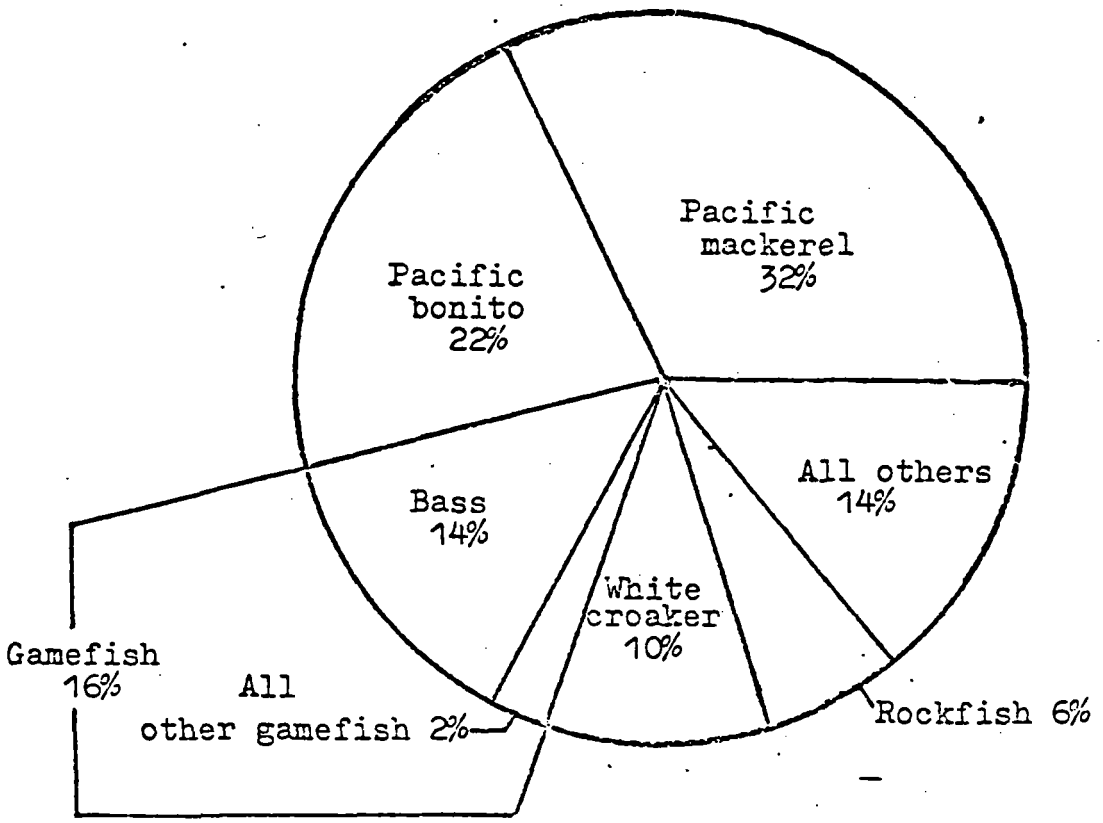


ANGLER CATCH



DIVER CATCH

FIGURE 6. Species composition of angler and diver catches, Los Angeles County.



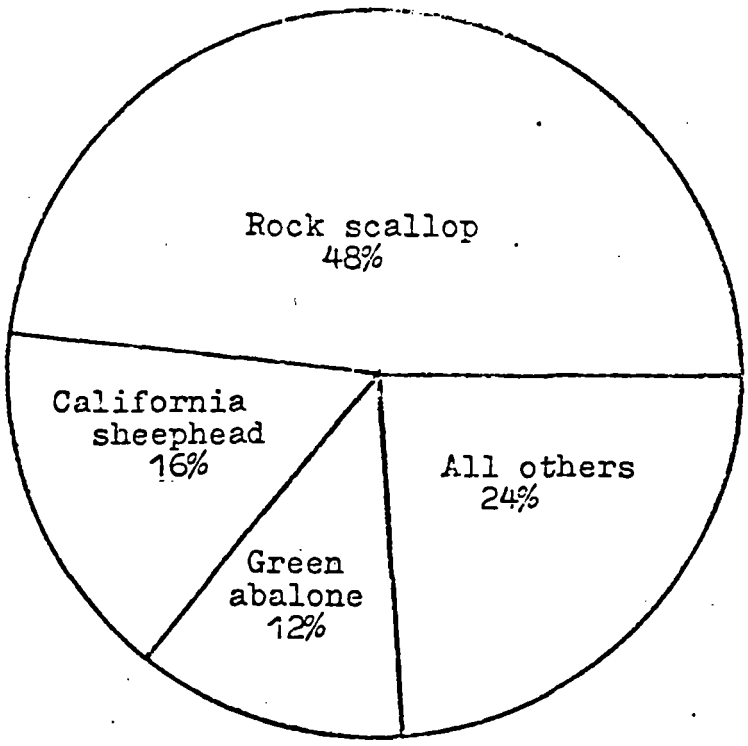
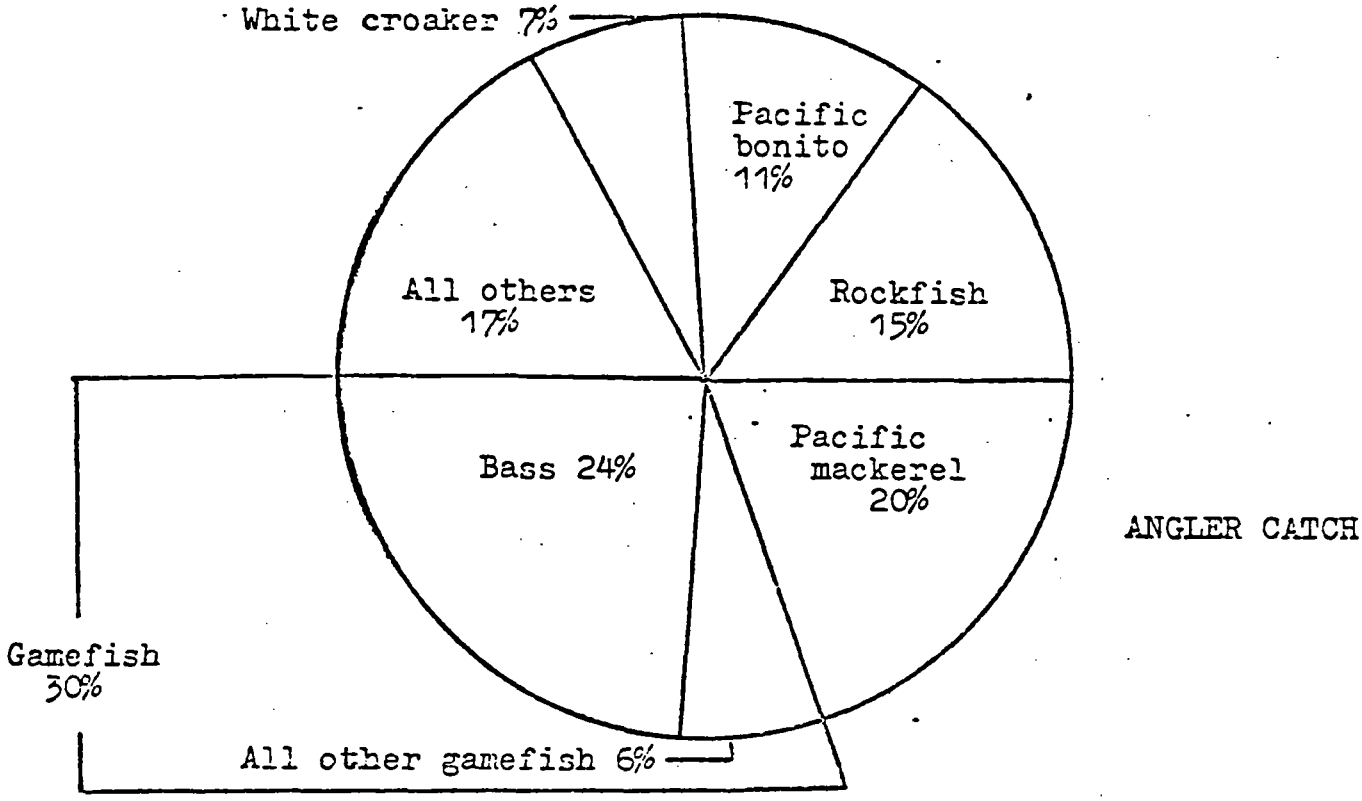


FIGURE 7. Species composition of angler and diver catches, Orange County.



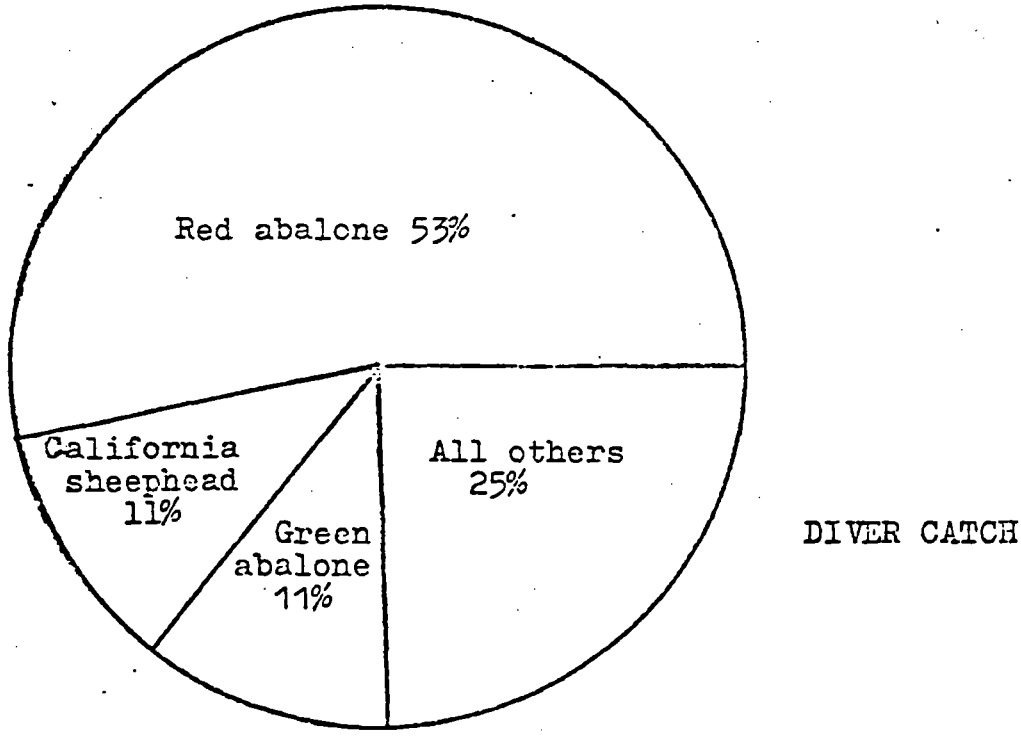


FIGURE 8. Species composition of angler and diver catches, San Diego County.

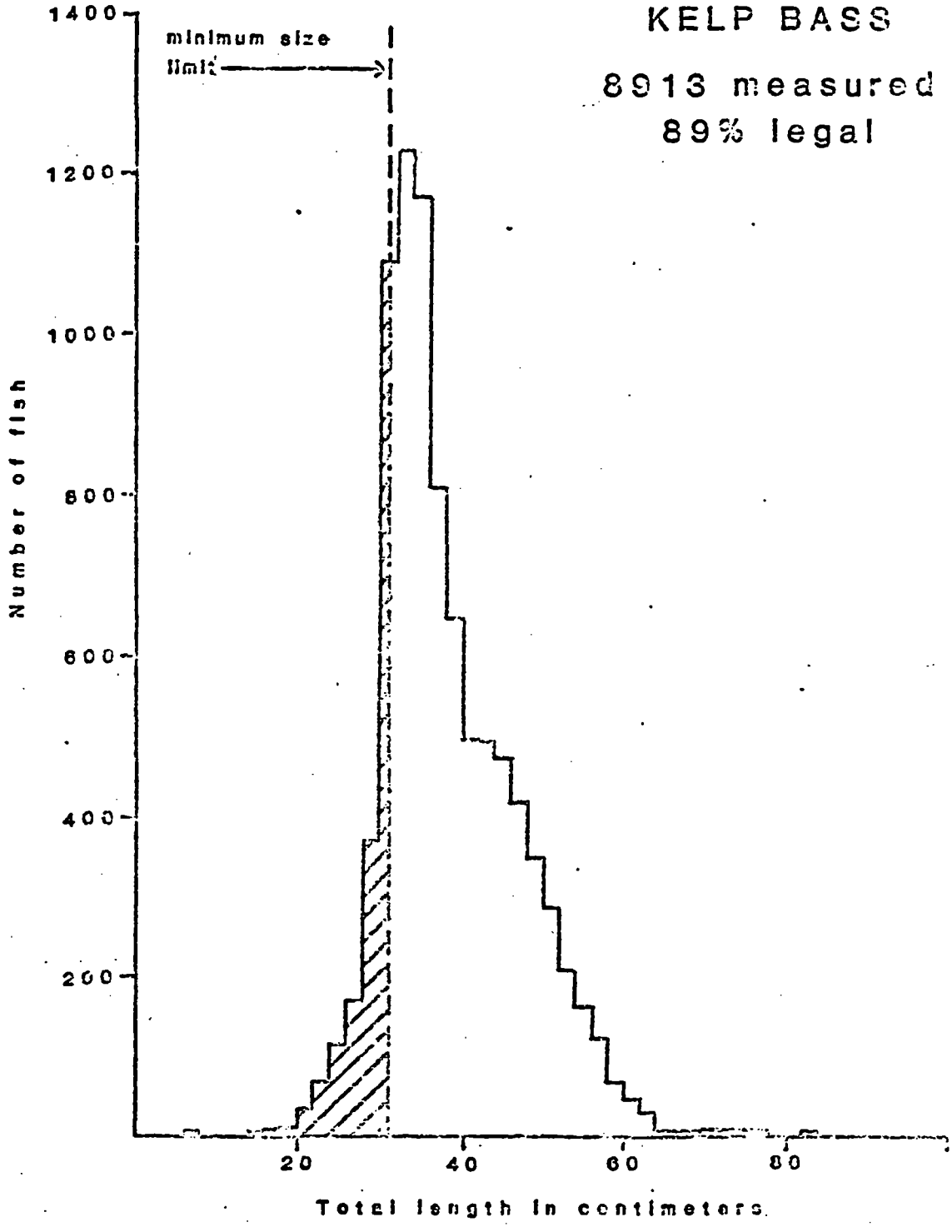


FIGURE 9. Length frequency of kelp bass.

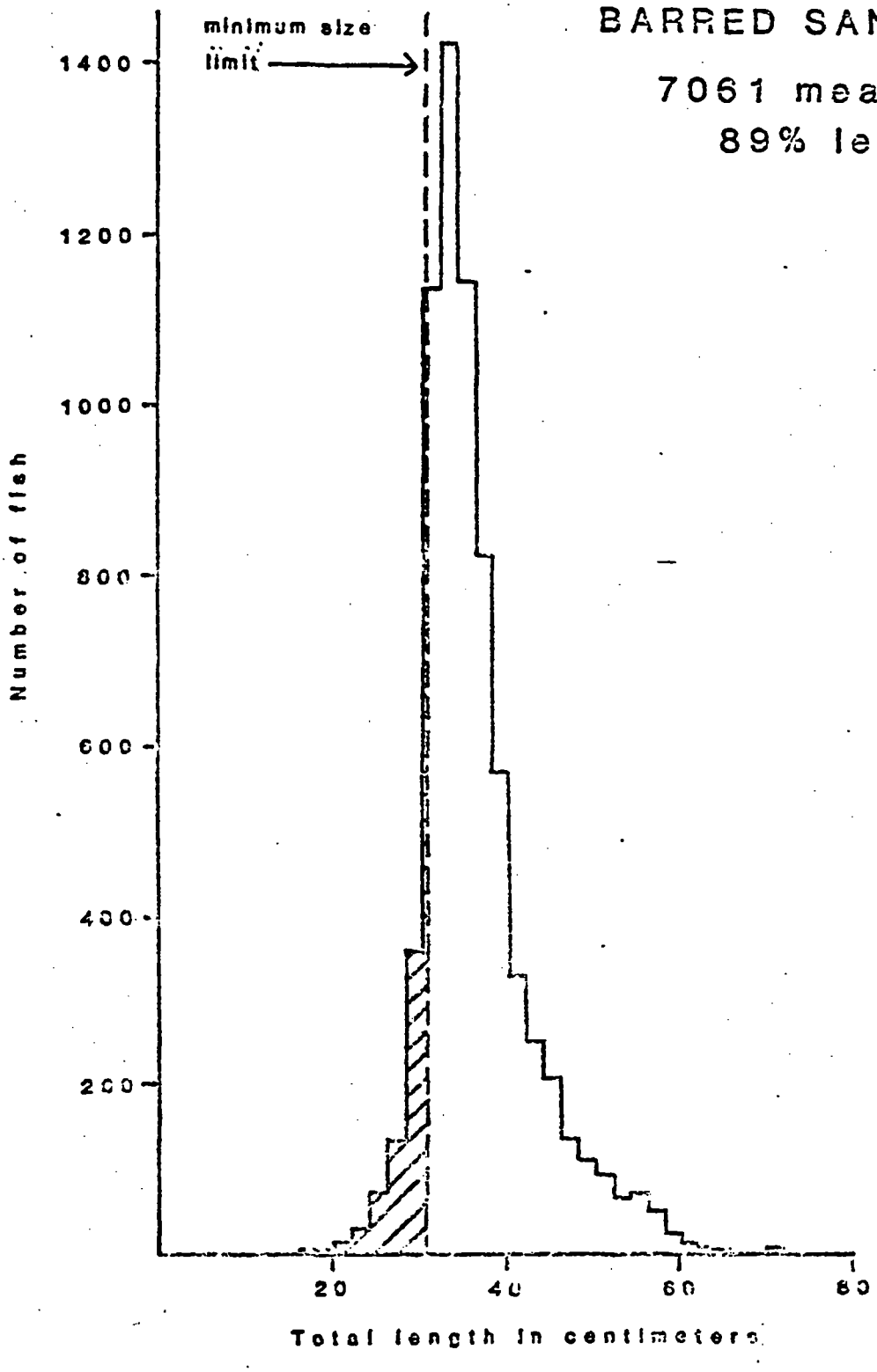


FIGURE 10. Length frequency of barred sand bass.

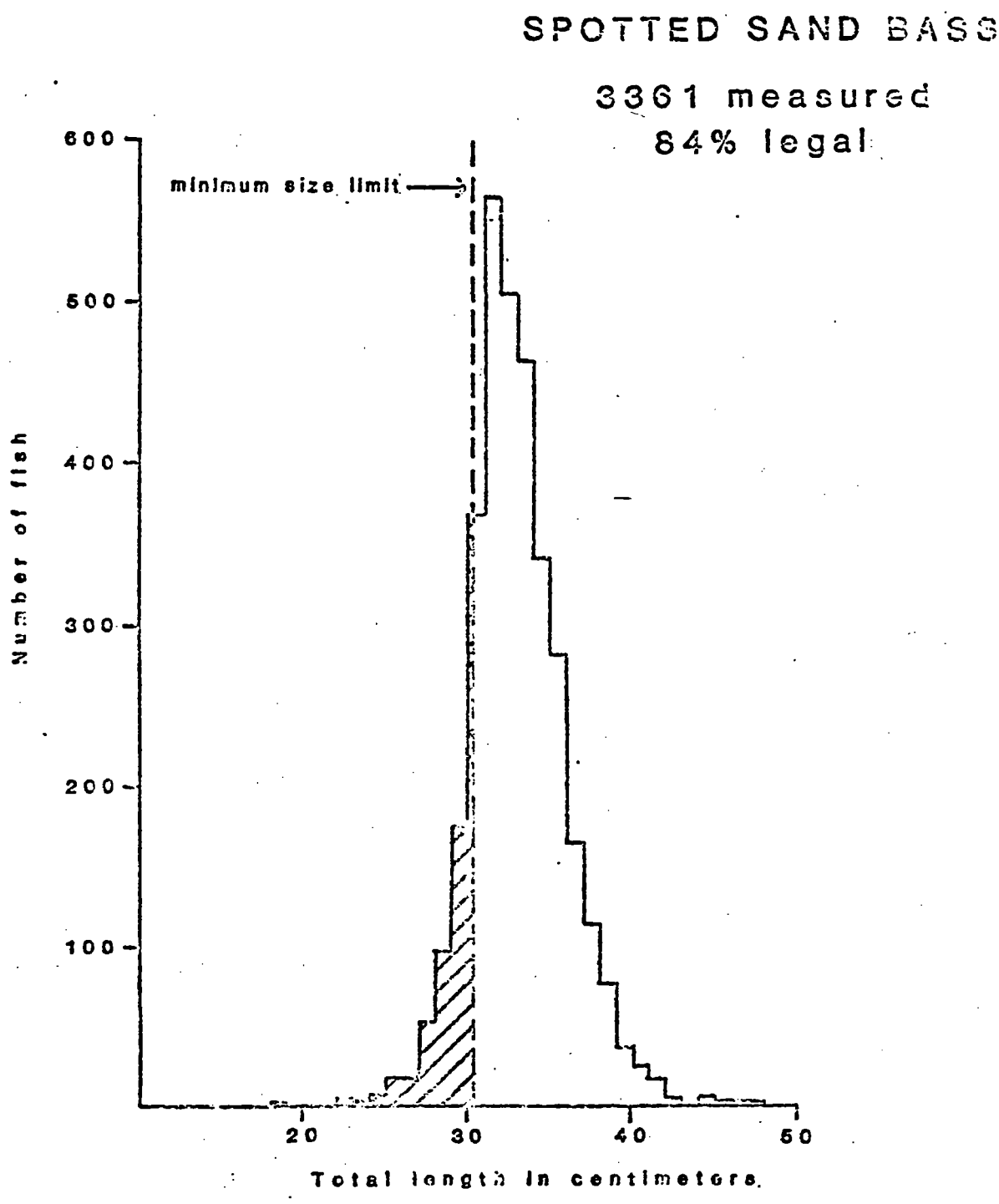


FIGURE 11. Length frequency of spotted sand bass.

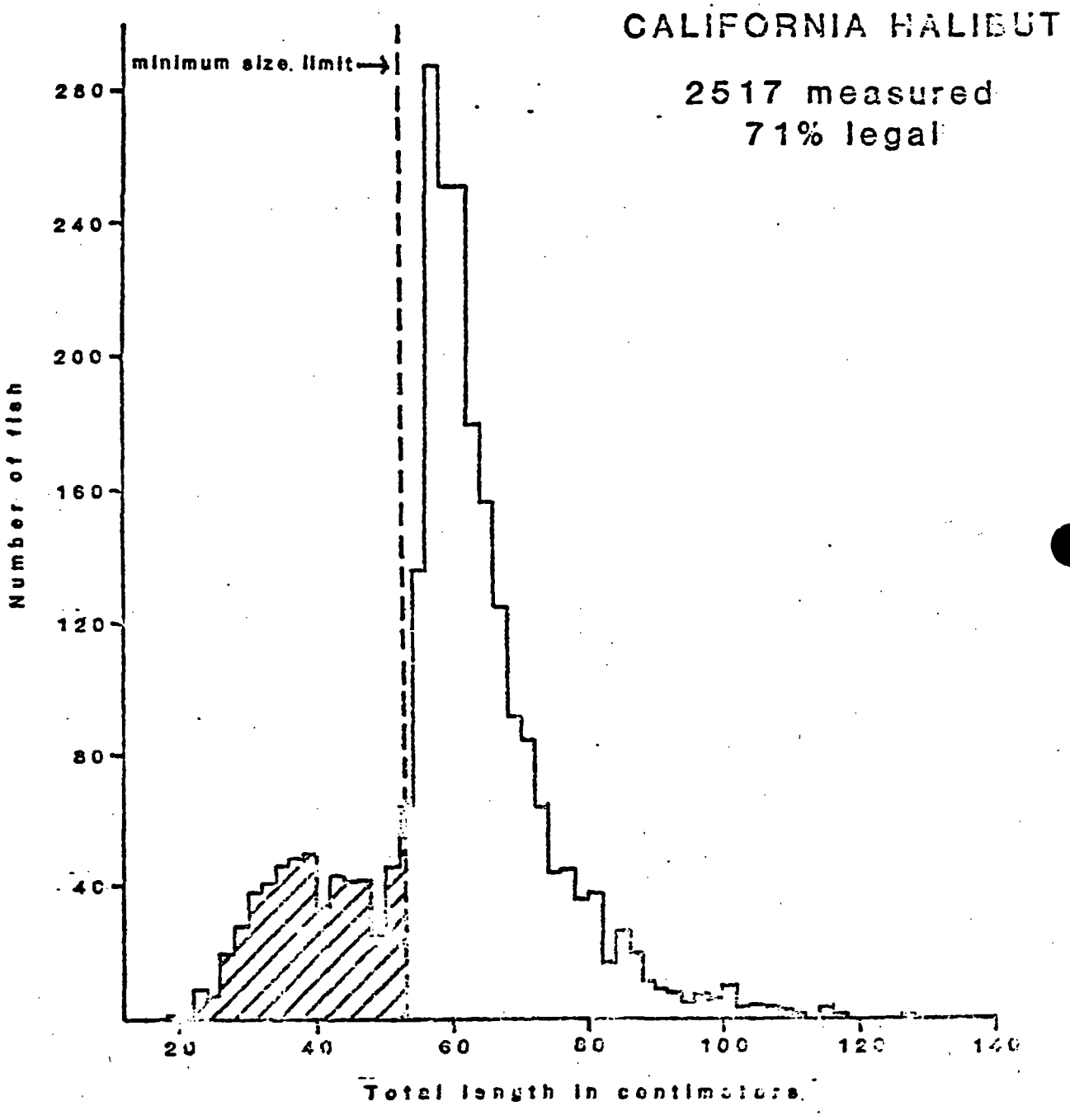


FIGURE 12. Length frequency of California halibut.

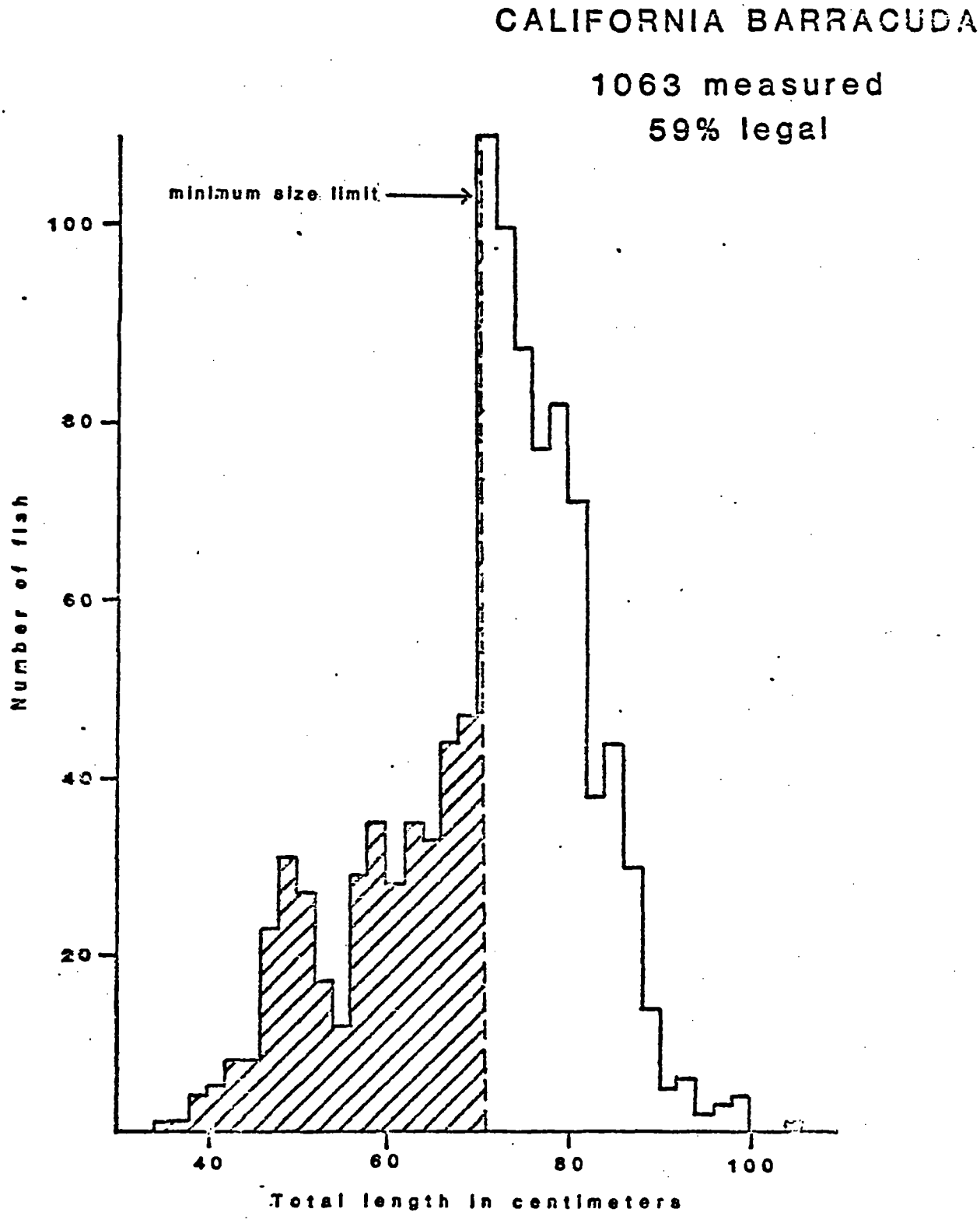
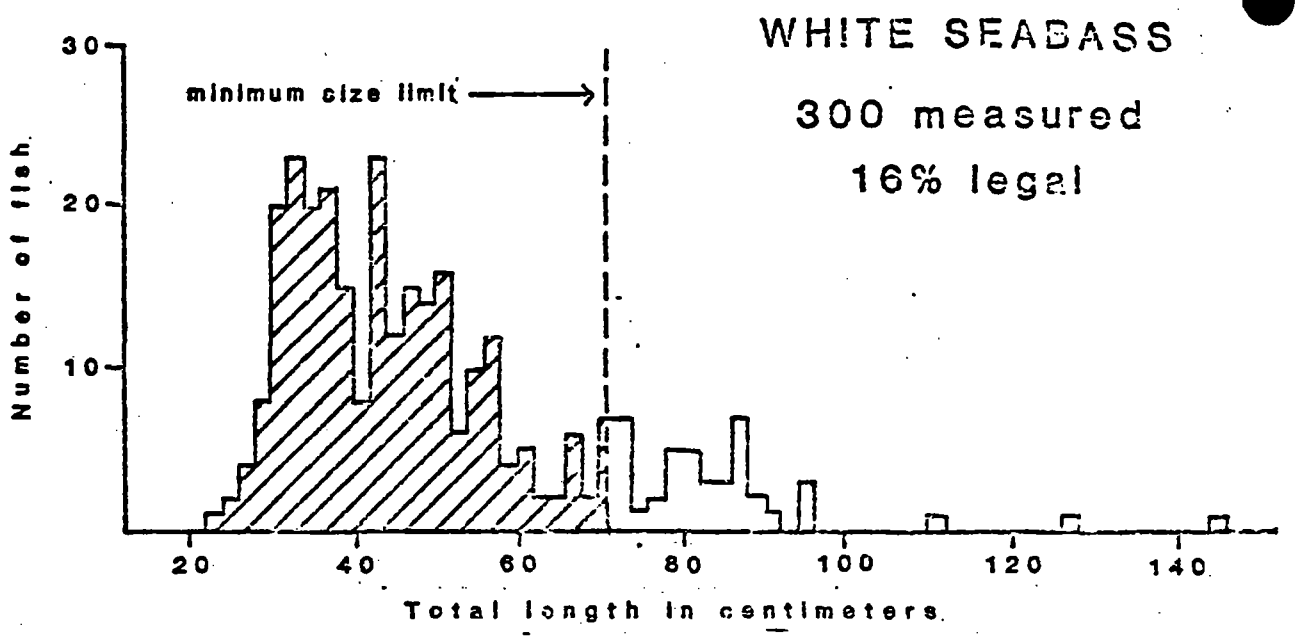


FIGURE 13. Length frequency California barracuda.



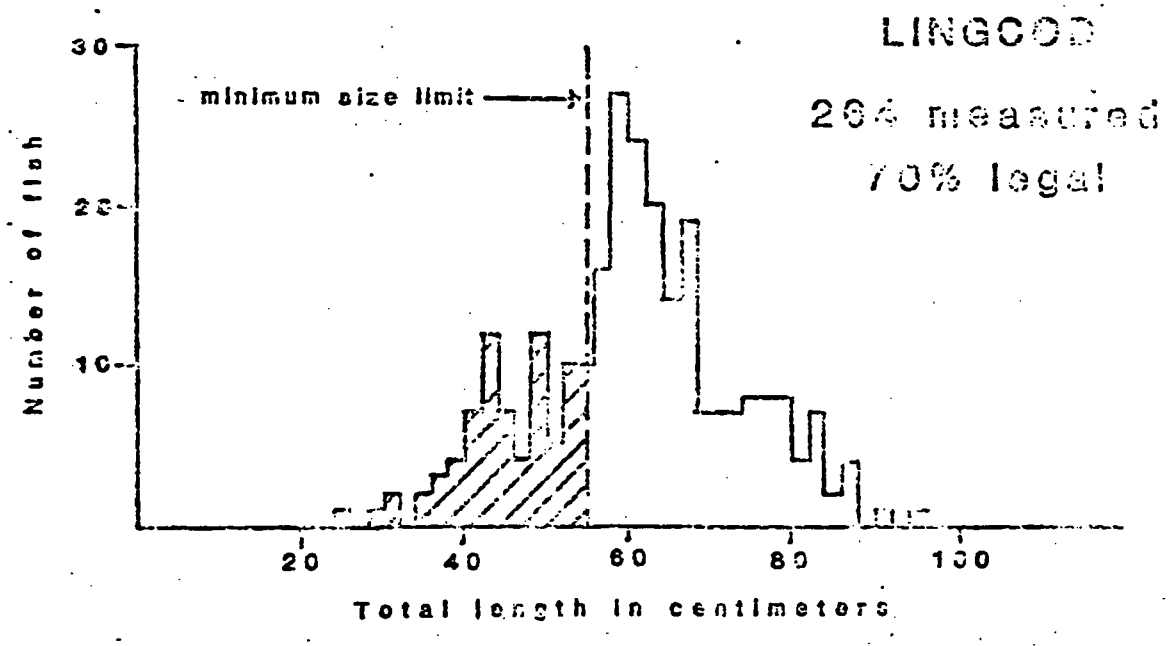


FIGURE 14. Length frequencies of white seabass and lingcod.

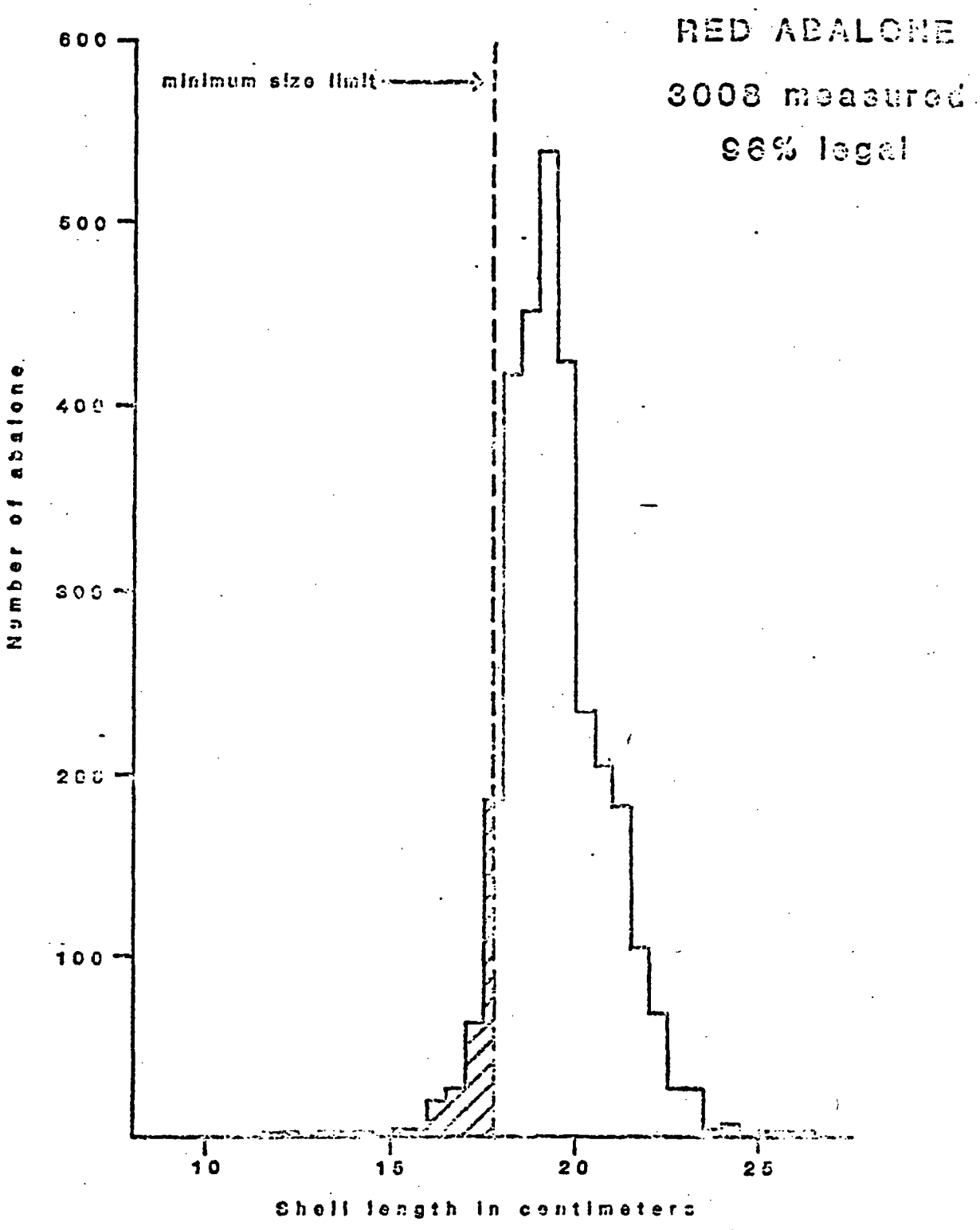


FIGURE 15. Length frequency of red abalone.

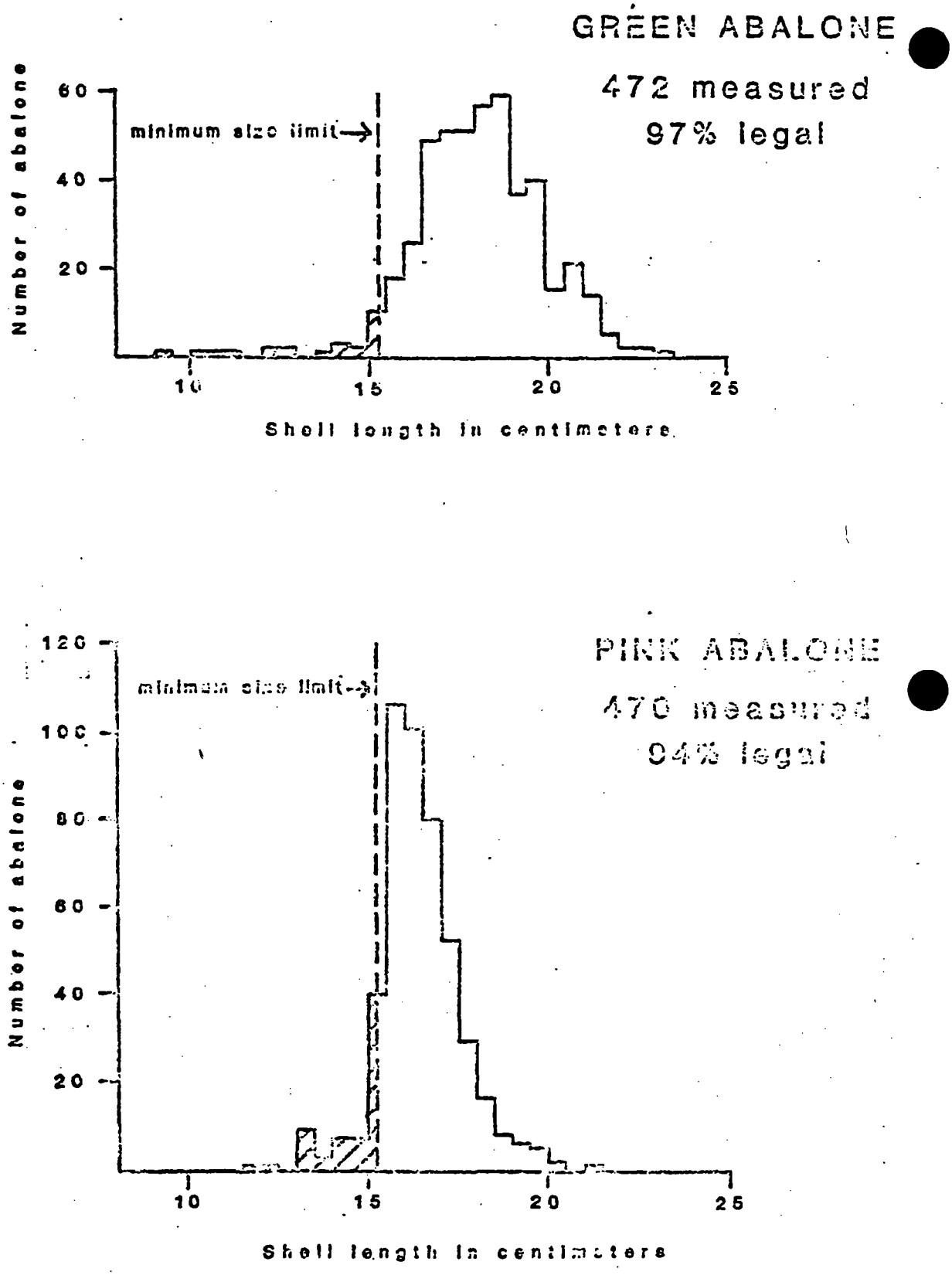


FIGURE 16. Length frequencies green abalone and pink abalone.

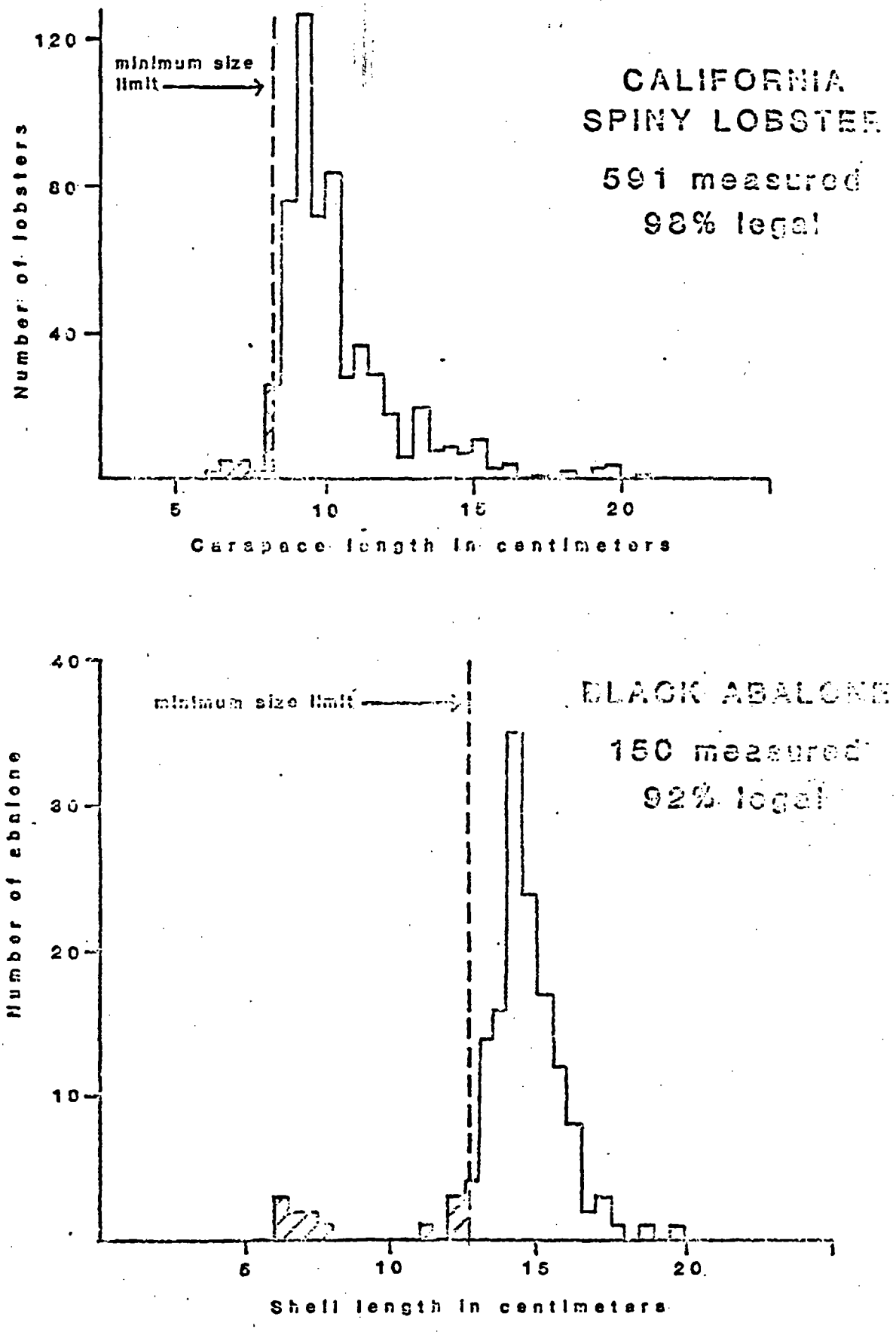


FIGURE 17. Length frequencies of California spiny lobster and black abalone.

TABLE 1. List of Species Sampled from Southern California Private-boats.

Scientific name	Common name	No. sampled
	Fishes	
Acanthogobius flavimanus	yellowfin goby	3
Alopias superciliosus	bigeye thresher	1
A. vulpinus	common thresher	23
Amphistichus argenteus	barred surfperch	485
Anisotremus davidsonii	sargo	90
Anoplopoma fimbria	sablefish	270
Artedius notospilotus	boneyhead sculpin	1
Atherinops affinis	topsmelt	78
Atherinopsis californiensis	jacksmelt	969
Atractoscion nobilis	white seabass	394
Balistes polylepis	finescale triggerfish	41
Calamus brachysomus	Pacific porgy	1
Caulolatilus princeps	ocean whitefish	1,597
Cephaloscyllium ventriosum	swell shark	1
Cheilotrema saturnum	black croaker	159
Chromis punctipinnis	blacksmith	49
Citharichthys sordidus	Pacific sanddab	3,750
C. stigmaeus	speckled sanddab	4
C. xanthostigma	longfin sanddab	5
Coryphaena hippurus	dolphinfish	15
Cymatogaster aggregata	shiner surfperch	17
Cypselurus californicus	California flying fish	6
Damalichthys vacca	pile surfperch	152
Decapterus hypodus	Mexican scad	3
Embiotoca jacksoni	black surfperch	1,704
E. lateralis	striped surfperch	51
Eopsetta jordani	petrale sole	43
Galeorhinus zyopterus	soupfin shark	30
Genyonemus lineatus	white croaker	31,438
Girella nigricans	opaleye	1,296
Gymnothorax mordax	California moray	4
Gymnura marmorata	California butterfly ray	1
Halichoeres semicinctus	rock wrasse	76
Hermosilla azurea	zebraperch	7
Heterodontus francisci	horn shark	10
Heterostichus rostratus	giant kelpfish	193
Hexagrammos decagrammus	kelp greenling	1
Hippoglossina stomata	bigmouth sole	32
Hydrolagus colliei	ratfish	20
Hyperprosopon argenteum	walleye surfperch	182
H. ellipticum	silver surfperch	7
Hypsopsetta guttulata	diamond turbot	132
Hypsurus caryi	rainbow surfperch	68
Hypsypops rubicundus	garibaldi	4
Isurus oxyrhinchus	bonito shark	57
Lepidopsetta bilineata	rock sole	8

Table 1. cont'd.

Scientific name	Common name	No. sampled
Leptocottus armatus	staghorn sculpin	3
Leuresthes tenuis	California grunion	2
Medialuna californiensis	halfmoon	2,073
Menticirrhus undulatus	California corbina	19
Merluccius productus	Pacific hake	137
Mola mola	common mola	5
Mugil cephalus	striped mullet	23
Mustelus californicus	gray smoothhound	274
M. henlei	brown smoothhound	78
M. lunatus	sicklefin smoothhound	7
Myliobatis californica	bat ray	66
Neoclinus uninotatus	onespot fringehead	7
Oncorhynchus kisutch	silver salmon	1
Ophichthus tirserialis	spotted snake eel	1
Ophiodon elongatus	lingcod	337
Oxyjulis californica	senorita	614
Paralabrax clathratus	kelp bass	12,183
P. maculatofasciatus	spotted sand bass	4,806
P. nebulifer	barred sand bass	10,055
Paralichthys californicus	California halibut	2,750
Peprilus simillimus	Pacific butterfish	3
Phanerodon atripes	sharpnose surfperch	1
P. furcatus	white surfperch	245
Platichthys stellatus	starry flounder	2
Platyrhinoidis triseriata	thornback	44
Pleuronichthys coenosus	C O turbot	3
P. verticalis	horneyhead turbot	3
Porichthys myriaster	specklefin midshipman	13
P. notatus	plainfin midshipman	1
Prionace glauca	blue shark	232
Raja inornata	California skate	1
Rhacochilus toxotes	rubberlip	238
Rhinobatos productus	shovelnose guitarfish	301
Roccus saxatilis	striped bass	15
Roncador stearnsii	spotfin croaker	51
Sarda chiliensis	Pacific bonito	34,053
Sardinops sagax caeruleus	Pacific sardine	3
Scomber japonicus	Pacific mackerel	53,041
Scorpaena guttata	sculpin	4,343
Scorpaenichthys marmoratus	cabezon	641
Sebastes atrovirens	kelp rockfish	1,183
S. auriculatus	brown rockfish	1,070
S. babcocki	redbanded rockfish	4
S. carnatus	gopher rockfish	521
S. caurinus	copper rockfish	3,176
S. chlorostictus	greenspotted rockfish	2,710
S. chrysomelas	black & yellow rockfish	253
S. constellatus	starry rockfish	1,632
S. dalili	calico rockfish	47
S. diploproa	splitnose rockfish	13

Table 1. cont'd.

Scientific name	Common name	No. sampled
Sebastes elongatus	greenstriped rockfish	736
S. ensifer	swordspine rockfish	59
S. entomelas	widow rockfish	234
S. eos	pink rockfish	41
S. flavidus	yellowtail rockfish	180
S. gilli	bronzespotted rockfish	8
S. goodei	chilipepper	1,057
S. helvomaculatus	rosethorn rockfish	7
S. hopkinsi	squarespot rockfish	140
S. jordani	shortbelly rockfish	1
S. levis	cowcod	132
S. macdonaldi	Mexican rockfish	11
S. melanops	black rockfish	1
S. melanostomus	blackgill rockfish	10
S. miniatus	vermilion rockfish	2,031
S. mystinus	blue rockfish	4,811
S. nebulosus	china rockfish	1
S. ovalis	speckled rockfish	695
S. paucispinis	bocaccio	4,747
S. phillipsi	chameleon rockfish	10
S. pinniger	canary rockfish	73
S. rastrelliger	grass rockfish	1,121
S. rosaceus	rosy rockfish	1,052
S. rosenblatti	greenblotched rockfish	242
S. ruberrimus	yelloweye rockfish	5
S. rubrivinctus	flag rockfish	633
S. rufus	bank rockfish	46
S. saxicola	stripetail rockfish	28
S. semicinctus	halfbanded rockfish	10
S. serranoides	olive rockfish	3,209
S. serriceps	treefish	568
S. umbrosus	honeycomb rockfish	309
S. zacentrus	sharpchin rockfish	1
Sebastolobus alascanus	shortspine thornyhead	3
Semicossyphus pulcher	California sheephead	3,405
Seriola dorsalis	yellowtail	1,642
Seriphus politus	queenfish	3,216
Sphyraena argentea	California barracuda	1,803
Sphyrna zygaena	smooth hammerhead	2
Squalus acanthias	spiny dogfish	395
Squatina californica	Pacific angel shark	10
Stereolepis gigas	giant sea bass	36
Strongylura exilis	California needlefish	14
Synodus lucioceps	California lizardfish	227
Tetrapturus audax	striped marlin	11
Thunnus alalunga	albacore	431
T. albacares	yellowfin tuna	42
T. thynnus	bluefin tuna	1
Tilapia sp.	tilapia	2

Table 1. cont'd.

Scientific name	Common name	No. sampled
Torpedo californica	Pacific electric ray	2
Trachurus symmetricus	jack mackerel	495
Triakis semifasciata	leopard shark	76
Umbrina roncador	yellowfin croaker	981
Urolophus halleri	round stingray	14
Xenistius californiensis	salema	1
Xystreurys liolepis	fantail sole	19
Zapteryx exasperata	banded guitarfish	1
Sebastes spp.	unidentified filleted rockfish	5,507
---	unidentified filleted fish	5,187
---	unidentified fish	308
Bothidae	unidentified sanddab	14
Gobiidae	unidentified goby	1
	Mollusks and Crustaceans	
Acmaea spp.	unidentified limpet	4
Astraea undosa	wavy top	2
Cancer antennarius	rock crab	197
C. anthonyi	yellow crab	30
C. productus	red crab	74
Cypraea spadicea	chestnut cowry	21
Fissurella volcano	volcano limpet	2
Haliotis corrugata	pink abalone	544
H. cracherodii	black abalone	172
H. fulgens	green abalone	739
H. rufescens	red abalone	3,478
H. sorenseni	white abalone	26
Hinnites multirugosus	rock scallop	2,948
Kelletia kelletii	kellets whelk	38
Loxorhynchus grandis	sheep crab	145
Megathura crenulata	giant keyhole limpet	4
Mytilus californianus	California seamussel	80
Octopus spp.	octopus	22
Oregonia gracilis	graceful decorator crab	1
Pachygrapsus crassipes	striped shore crab	7
Panulirus interruptus	California spiny lobster	774
Pugettia gracilis	graceful kelp crab	1
Tivela stultorum	Pismo clam	113
---	unidentified crab	12
---	unidentified mollusks	31
	Echinoderms and Coelenterates	
Dendraster excentricus	sand dollar	9
Strongylocentrotus franciscanus	red urchin	170
S. purpuratus	purple urchin	66

Table 1. cont'd.

Scientific name	Common name	No. sampled
Anthozoa	sea anemone	1
Asteroidea	sea star	78
Gorgonacea	sea fan	1
---	unidentified echinoderm	10

TABLE 2. Most Commonly Landed Species.

Scientific name	Common name	No. sampled
	Fishes	
Scomber japonicus	Pacific mackerel	53,041
Sarda chiliensis	Pacific bonito	34,053
Genyonemus lineatus	white croaker	31,438
Paralabrax clathratus	kelp bass	12,183
P. nebulifer	barred sand bass	10,055
Sebastes mystinus	blue rockfish	4,811
P. maculatofasciatus	spotted sand bass	4,806
S. paucispinis	bocaccio	4,747
Scorpaena guttata	sculpin	4,343
Citharichthys sordidus	Pacific sanddab	3,750
Semicossyphus pulcher	California sheephead	3,405
Seriphus politus	queenfish	3,216
Sebastes serranoides	olive rockfish	3,209
S. caurinus	copper rockfish	3,176
Paralichthys californicus	California halibut	2,750
S. chlorostictus	greenspotted rockfish	2,710
Medialuna californiensis	halfmoon	2,073
S. miniatus	vermilion rockfish	2,031
Sphyraena argentea	California barracuda	1,803
Embiotoca jacksoni	black surfperch	1,704
Seriola dorsalis	yellowtail	1,642
Sebastes constellatus	starry rockfish	1,632
Caulolatilus princeps	ocean whitefish	1,597
Girella nigricans	opaleye	1,296
Sebastes atrovirens	kelp rockfish	1,183
S. rastrelliger	grass rockfish	1,121
S. auriculatus	brown rockfish	1,070
S. goodei	chilipepper	1,067
S. rosaceus	rosy rockfish	1,052
Umbrina roncador	yellowfin croaker	981
Atherinopsis californiensis	jacksmelt	969
Sebastes elongatus	greenstriped rockfish	736
S. ovalis	speckled rockfish	695
Scorpaenichthys marmoratus	cabezon	641
Sebastes rubrivinctus	flag rockfish	633
Oxyjulis californica	senorita	568
	Mollusks and Crustaceans	
Haliotis rufescens	red abalone	3,478
Hinnites multirugosus	rock scallop	2,948
Panulirus interruptus	California spiny lobster	774
Haliotis fulgens	green abalone	739

These 40 species constitute 95% of the identified catch. The remaining 5% is composed of 11,432 organisms of 143 species.

TABLE 3. Catch and Effort Estimates for Anglers.

	Santa Barbara/ Ventura Counties	Los Angeles County	Orange County	San Diego County	Total
Angler parties					
weekend	7,536	32,642	20,182	22,223	82,583
weekday	4,778	19,414	10,387	15,799	50,378
total	12,314	52,056	30,569	38,022	132,961
Angler trips					
weekend	20,101	89,215	52,904	57,875	220,095
weekday	11,830	47,068	23,749	36,267	118,914
total	31,931	136,283	76,653	94,142	339,009
Angler-trip-hours					
weekend	129,261	569,899	334,127	401,086	1,434,370
weekday	69,488	282,697	138,916	252,688	743,834
total	198,749	852,596	473,088	653,774	2,178,210
Total fishes landed					
weekend	75,875	275,183	98,257	130,330	579,645
weekday	48,941	186,726	56,218	90,949	382,834
total	124,816	461,909	154,475	221,279	962,479
No. rockfishes landed					
weekend	34,077	33,334	7,563	23,111	98,075
weekday	16,648	14,097	2,319	10,979	44,043
total	50,725	47,421	9,882	34,090	142,118
Atractoscion nobilis (white seabass)	81	542	610	517	1,750
Caulolatilus princeps (ocean whitefish)	834	2,711	305	3,009	6,859
Citharichthys sordidus (Pacific sanddab)	2,052	7,617	1,464	8,240	19,373
Embiotoca jacksoni (black surfperch)	191	4,557	970	238	5,956

Table 3 - cont'd.

	Santa Barbara/ Ventura Counties	Los Angeles County	Orange County	San Diego County	Total
Genyonemus lineatus (white croaker)	18,361	98,094	16,258	14,998	147,711
Girella nigricans (opaleye)	419	2,911	487	520	4,337
Medialuna californiensis (halfmoon)	400	6,432	1,407	1,123	9,362
Oncorhynchus tshawytscha (king salmon)	0	0	0	0	0
Ophiodon elongatus (lingcod)	527	55	-45	332	959
Paralabrax clathratus (kelp bass)	10,432	18,515	5,779	12,248	46,974
P. maculatofasciatus (spotted sand bass)	8	341	4,600	18,984	23,930
P. nebulifer (barred sand bass)	1,454	15,696	10,457	21,302	48,909
Paralichthys californicus (California halibut)	2,561	4,481	742	2,313	10,097
Sarda chiliensis (Pacific bonito)	9,752	88,300	33,811	25,152	157,015
Scomber japonicus (Pacific mackerel)	17,699	119,551	49,905	43,769	230,924
Scorpaena guttata (sculpin)	863	10,698	1,662	5,332	18,555
Sebastes atrovirens (kelp rockfish)	1,150	1,185	8	1,814	4,157
S. auriculatus (brown rockfish)	1,570	1,054	124	616	3,364
S. caurinus (copper rockfish)	7,386	803	89	514	8,792
S. chlorostictus (greenspotted rockfish)	2,966	4,242	818	3,290	11,316

Table 3 - cont'd.

	Santa Barbara/ Ventura Counties	Los Angeles County	Orange County	San Diego County	Total
Sebastes goodei (chilipepper)	532	1,188	1,201	993	3,914
S. miniatus (vermilion rockfish)	2,625	1,202	569	2,347	6,743
S. mystinus (blue rockfish)	8,051	2,025	199	936	11,211
S. paucispinus (bocaccio)	1,890	9,584	1,471	4,944	17,889
S. rastrelliger (grass rockfish)	1,597	1,708	173	314	3,792
S. serranoides (olive rockfish)	2,600	6,188	797	2,536	12,121
Semicossyphus pulcher (California sheephead)	423	1,932	1,947	2,724	7,026
Seriola dorsalis (yellowtail)	6	1,053	353	6,509	7,917
Seriphus politus (queenfish)	228	8,022	3,838	3,922	16,010
Sphyraena argentea (California barracuda)	152	4,753	1,665	1,769	8,339
Thunnus alalunga (albacore)	0	0	17	2,401	2,418
Trachurus symmetricus (jack mackerel)	169	1,032	168	501	1,870

TABLE 4. Standard Error of the Estimates for Anglers.

	Santa Barbara/ Ventura Counties	Los Angeles County	Orange County	San Diego County	Total
Angler parties	643	1,694	1,480	2,214	3,221
Angler trips	1,692	4,555	3,577	5,691	8,295
Angler-trip-hours	10,116	30,141	22,192	44,602	59,099
Total fishes landed	9,285	18,587	8,670	16,384	27,844
No. rockfishes landed	3,934	3,157	853	3,067	5,965
albacore	0	0	11	1,066	1,067
barred sand bass	226	2,439	1,096	2,380	3,588
black surfperch	49	654	267	72	711
blue rockfish	604	644	57	140	896
bocaccio	203	1,055	186	552	1,222
brown rockfish	219	129	35	106	278
California barracuda	48	762	287	311	873
California halibut	327	459	84	243	619
California sheephead	97	253	333	293	520
chilipepper	103	234	191	226	391
copper rockfish	1,145	111	23	98	1,155
grass rockfish	223	253	35	52	343
greenspotted rockfish	483	564	129	540	927
halfmoon	105	735	226	288	828
jack mackerel	64	319	49	134	355
kelp bass	1,011	1,476	659	1,100	2,201
kelp rockfish	217	320	4	234	452
king salmon	0	0	0	0	0
lingcod	89	14	14	43	101
ocean whitefish	175	505	58	406	674
olive rockfish	270	712	112	292	823
opaleye	87	421	85	129	457
Pacific bonito	1,143	6,842	4,121	4,042	9,024
Pacific mackerel	1,303	7,429	3,685	3,980	9,291
Pacific sanddab	251	2,408	232	3,099	3,939
queenfish	64	1,136	1,588	708	2,078
sculpin	114	879	170	650	1,112
spotted sand bass	2	104	650	1,932	2,041
vermilion rockfish	363	227	157	400	606
white croaker	6,786	8,128	2,347	1,873	11,006
white seabass	36	90	100	86	164
yellowtail	2	197	76	2,136	2,146

TABLE 5. Catch and Effort Estimates for Divers.

	Santa Barbara/ Ventura Counties	Los Angeles County	Orange County	San Diego County	Total
Diver parties					
weekend	773	958	647	2,200	4,578
weekday	449	574	299	819	2,141
total	1,222	1,532	946	3,019	6,719
Diver trips					
weekend	2,076	2,245	1,495	5,447	11,263
weekday	1,237	1,312	607	1,783	4,939
total	3,313	3,557	2,102	7,230	16,202
Diver-hours					
weekend	4,227	3,418	2,164	6,117	15,926
weekday	2,327	2,498	957	2,280	8,062
total	6,554	5,916	3,121	8,397	23,988
No. organisms landed					
weekend	8,458	8,618	4,337	14,709	36,122
weekday	3,847	3,779	1,713	5,331	14,670
total	12,305	12,397	6,050	20,040	50,792
Haliotis corrugata (pink abalone)	709	158	16	326	1,209
H. cracherodii (black abalone)	444	52	32	0	528
H. fulgens (green abalone)	40	529	738	2,160	3,467
H. rufescens (red abalone)	2,901	47	0	10,628	13,576
Hinnites multirugosus (rock scallop)	2,439	3,536	2,937	444	9,356
Panulirus interruptus (California spiny lobster)	1,364	2,161	56	405	3,986
Paralabrax clathratus (kelp bass)	414	708	257	601	1,980
Semicossyphus pulcher (California sheephead)	1,057	1,524	998	2,233	5,812

TABLE 6. Standard Error of the Estimates for Divers.

	Santa Barbara/ Ventura Counties	Los Angeles County	Orange County	San Diego County	Total
Diver parties	121	133	99	218	299
Diver trips	357	349	216	514	748
Diver-hours	759	1,063	391	703	1,534
No. organisms landed	1,337	1,474	771	1,618	2,676
black abalone	157	18	13	0	159
California sheephead	143	230	133	270	405
California spiny lobster	245	893	10	70	929
green abalone	9	102	260	480	513
kelp bass	92	129	52	76	183
pink abalone	64	52	5	52	93
red abalone	531	20	0	982	1,117
rock scallop	336	556	624	76	904

TABLE 7. Fifteen Most Commonly Landed Species in Each County.

County	Rank	Scientific name	Common name
Santa Barbara/ Ventura	1.	*Genyonemus lineatus*	white croaker
	2.	*Scomber japonicus*	Pacific mackerel
	3.	*Paralabrax clathratus*	kelp bass
	4.	*Sarda chiliensis*	Pacific bonito
	5.	*Sebastes mystinus*	blue rockfish
	6.	*S. caurinus*	copper rockfish
	7.	*S. chlorostictus*	greenspotted rockfish
	8.	*Haliotis rufescens*	red abalone
	9.	*S. miniatus*	vermilion rockfish
	10.	*S. serranoides*	olive rockfish
	11.	*Paralichthys californicus*	California halibut
	12.	*Hinnites multirugosus*	rock scallop
	13.	*Citharichthys sordidus*	Pacific sanddab
	14.	*S. paucispinis*	bocaccio
	15.	*S. rostrelliger*	grass rockfish
Los Angeles	1.	*Scomber japonicus*	Pacific mackerel
	2.	*Genyonemus lineatus*	white croaker
	3.	*Sarda chiliensis*	Pacific bonito
	4.	*Paralabrax clathratus*	kelp bass
	5.	*P. nebulifer*	barred sand bass
	6.	*Scorpaena guttata*	sculpin
	7.	*Sebastes paucispinis*	bocaccio
	8.	*Seriphus politus*	queenfish
	9.	*Citharichthys sordidus*	Pacific sanddab
	10.	*Medialuna californiensis*	halfmoon
	11.	*Sebastes serranoides*	olive rockfish
	12.	*Sphyraena argentea*	California barracuda
	13.	*Embiotoca jacksoni*	black surfperch
	14.	*Paralichthys californicus*	California halibut
	15.	*Sebastes chlorostictus*	greenspotted rockfish
Orange	1.	*Scomber japonicus*	Pacific mackerel
	2.	*Sarda chiliensis*	Pacific bonito
	3.	*Genyonemus lineatus*	white croaker
	4.	*Paralabrax nebulifer*	barred sand bass
	5.	*P. clathratus*	kelp bass
	6.	*P. maculatofasciatus*	spotted sand bass
	7.	*Semicossyphus pulcher*	California sheephead
	8.	*Hinnites multirugosus*	rock scallop
	9.	*Scorpaena guttata*	sculpin
	10.	*Citharichthys sordidus*	Pacific sanddab
	11.	*Sphyraena argentea*	California barracuda
	12.	*Sebastes paucispinis*	bocaccio
	13.	*Seriphus politus*	queenfish
	14.	*Sebastes goodei*	chilipepper
	15.	*Medialuna californiensis*	halfmoon

Table 7. - cont'd.

County	Rank	Scientific name	Common name
San Diego	1.	*Scomber japonicus*	Pacific mackerel
	2.	*Sarda chiliensis*	Pacific bonito
	3.	*Paralabrax nebulifer*	barred sand bass
	4.	*P. maculatofasciatus*	spotted sand bass
	5.	*Genyonemus lineatus*	white croaker
	6.	*P. clathratus*	kelp bass
	7.	*Haliotis rufescens*	red abalone
	8.	*Citharichthys sordidus*	Pacific sanddab
	9.	*Seriola dorsalis*	yellowtail
	10.	*Scorpaena guttata*	sculpin
	11.	*Semicossyphus pulcher*	California sheephead
	12.	*Sebastes paucispinis*	bocaccio
	13.	*Seriphus politus*	queenfish
	14.	*Sebastes chlorostictus*	greenspotted rockfish
	15.	*Caulolatilus princeps*	ocean whitefish

TABLE 8. Success Rates of Fishing Parties.

County	% Fishing parties who:		
	kept catch	discarded catch	had no catch
Santa Barbara	73	18	9
Ventura	76	16	8
Los Angeles	70	21	9
Orange	57	28	15
San Diego	68	20	12

TABLE 9. Occurrence of Sublegal Fishes in Examined Catches.

Scientific name	Common name	No. measured	% legal
	Fishes		
Atractoscion nobilis	white seabass	300	16
Ophiodon elongatus	lingcod	264	70
Paralabrax clathratus	kelp bass	8,913	89
P. maculatofasciatus	spotted sand bass	3,361	84
P. nebulifer	barred sand bass	7,061	89
Paralichthys californicus	California halibut	2,517	71
Sphyraena argentea	California barracuda	1,063	50
	Mollusks and Crustaceans –		
Cancer antennarius	rock crab	84	94
Haliotis corrugata	pink abalone	470	94
H. cracherodii	black abalone	150	92
H. fulgens	green abalone	472	97
H. rufescens	red abalone	3,008	96
Panulirus interruptus	California spiny lobster	591	98

APPENDIX

Raw Data for Effort and Most Commonly Landed Species at Each Sample Location

LOCATION: Gaviota

COUNTY: Santa Barbara

57	sample days
922	anglers
258	divers
6,303	angler-trip-hours
491	diver-hours
4,857	fishes sampled
73	species identified

Most Commonly Landed Species

Scientific name	Common name	Number landed	% of total
Sarda chiliensis	Pacific bonito	1,004	21
Haliotis rufescens	red abalone	748	15
Scomber japonicus	Pacific mackerel	742	15
Paralabrax clathratus	kelp bass	347	7
Paralichthys californicus	California halibut	343	7
Sebastes caurinus	copper rockfish	200	4
S. mystinus	blue rockfish	127	3
S. serranoides	olive rockfish	97	2
Amphistichus argenteus	barred surfperch	96	2
Cancer antennarius	rock crab	96	2
			78%

LOCATION: Santa Barbara

COUNTY: Santa Barbara

80	sample days
4,940	anglers
425	divers
29,713	angler-trip-hours
905	diver-hours
15,914	fishes sampled
95	species identified

Most Commonly Landed Species

Scientific name	Common name	Number landed	% of total
Scomber japonicus	Pacific mackerel	2,466	15
Paralabrax clathratus	kelp bass	1,981	12
Sarda chiliensis	Pacific bonito	1,890	12
Sebastes caurinus	copper rockfish	717	5
Hinnites multirugosus	rock scallop	551	4
Genyonemus lineatus	white croaker	537	3
S. serranoides	olive rockfish	536	3
S. chlorostictus	greenspotted rockfish	464	3
Paralichthys californicus	California halibut	453	3
S. mystinus	blue rockfish	340	2
			61%

LOCATION: Ventura

COUNTY: Ventura

71	sample days
2,522	anglers
150	divers
15,791	angler-trip-hours
341	diver-hours
10,734	fishes sampled
89	species identified

Most Commonly Landed Species

Scientific name	Common name	Number landed	% of total
Genyonemus lineatus	white croaker	2,320	22
Scomber japonicus	Pacific mackerel	1,671	16
Paralabrax clathratus	kelp bass	1,013	9
Sebastes mystinus	blue rockfish	711	7
S. caurinus	copper rockfish	481	4
Sarda chiliensis	Pacific bonito	350	3
Sebastes serranoides	olive rockfish	287	3
Paralichthys californicus	California halibut	260	2
Hinnites multirugosus	rock scallop	182	2
Citharichthys sordidus	Pacific sanddab	177	2
			70%

LOCATION: Oxnard I (new ramp)

COUNTY: Ventura

66	sample days
3,942	anglers
426	divers
27,745	angler-trip-hours
721	diver-hours
18,028	fishes sampled
104	species identified

Most Commonly Landed Species

Scientific name	Common name	Number landed	% of total
Sebastes mystinus	blue rockfish	2,611	14
Scomber japonicus	Pacific mackerel	1,751	10
Genyonemus lineatus	white croaker	1,598	9
Sebastes caurinus	copper rockfish	1,234	7
Paralabrax clathratus	kelp bass	1,013	6
Citharichthys sordidus	Pacific sanddab	670	4
S. constellatus	starry rockfish	572	3
S. rosaceus	rosy rockfish	492	3
S. miniatus	vermilion rockfish	483	3
Sarda chiliensis	Pacific bonito	480	3
			62%

LOCATION: Oxnard II (old ramp - sampled Aug.-Dec., 1981)

COUNTY: Ventura

27	sample days
1,096	anglers
59	divers
6,696	angler-trip-hours
82	diver-hours
5,646	fishes sampled
80	species identified

Most Commonly Landed Species

Scientific name	Common name	Number landed	% of total
Scomber japonicus	Pacific mackerel	800	14
Genyonemus lineatus	white croaker	454	8
Sebastes mystinus	blue rockfish	425	8
Paralabrax clathratus	kelp bass	301	5
S. caurinus	copper rockfish	242	4
S. paucispinis	bocaccio	218	4
Sarda chiliensis	Pacific bonito	208	4
Sebastes rosaceus	rosy rockfish	181	3
S. auriculatus	brown rockfish	181	3
Girella nigricans	opaleye	158	3
			56%

LOCATION: Paradise Cove

COUNTY: Los Angeles

49	sample days
1,803	anglers
71	divers
13,066	angler-trip-hours
108	diver-hours
6,777	fishes sampled
83	species identified

Most Commonly Landed Species

Scientific name	Common name	Number landed	% of total
Scomber japonicus	Pacific mackerel	2,128	31
Genyonemus lineatus	white croaker	1,014	15
Paralabrax clathratus	kelp bass	754	11
P. nebulifer	barred sand bass	267	4
Scorpaena guttata	sculpin	244	4
Hinnites multirugosus	rock scallop	241	4
Sebastes atrovirens	kelp rockfish	240	4
S. rastrelliger	grass rockfish	224	3
Sarda chiliensis	Pacific bonito	214	3
Paralichthys californicus	California halibut	129	2
			81%

LOCATION: Marina del Rey

COUNTY: Los Angeles

56	sample days
5,404	anglers
113	divers
34,463	angler-trip-hours
153	diver-hours
14,909	fishes sampled
106	species identified

Most Commonly Landed Species

Scientific name	Common name	Number landed	% of total
Genyonemus lineatus	white croaker	4,049	27
Scomber japonicus	Pacific mackerel	2,303	15
Sarda chiliensis	Pacific bonito	1,811	12
Sebastes paucispinis	bocaccio	954	6
S. chlorostictus	greenspotted rockfish	626	4
Paralabrax nebulifer	barred sand bass	549	4
P. clathratus	kelp bass	539	4
Paralichthys californicus	California halibut	386	3
Scorpaena guttata	sculpin	384	3
Citharichthys sordidus	Pacific sanddab	208	1
			79%

LOCATION: Redondo Beach Hoist

COUNTY: Los Angeles

53	sample days
5,165	anglers
278	divers
32,078	angler-trip-hours
303	diver-hours
14,442	fishes sampled
109	species identified

Most Commonly Landed Species

Scientific name	Common name	Number landed	% of total
Sarda chiliensis	Pacific bonito	6,698	46
Scomber japonicus	Pacific mackerel	2,324	16
Sebastes paucispinis	bocaccio	889	6
Hirnitos multirugosus	rock scallop	457	3
Paralabrax clathratus	kelp bass	467	3
Scorpaena guttata	sculpin	392	3
Sebastes serranoides	olive rockfish	283	2
Paralabrax nebulifer	barred sand bass	246	2
Semicossyphus pulcher	California sheephead	246	2
Caulolatilus princeps	ocean whitefish	199	1
			34%

LOCATION: Redondo Beach Rental

COUNTY: Los Angeles

39	sample days
2,775	anglers
0	divers
17,637	angler-trip-hours
0	diver-hours
6,551	fishes sampled
38	species identified

Most Commonly Landed Species

Scientific name	Common name	Number landed	% of total
Sarda chiliensis	Pacific bonito	4,572	70
Scomber japonicus	Pacific mackerel	1,563	24
Paralichthys californicus	California halibut	80	1
Trachurus symmetricus	jack mackerel	60	1
Paralabrax nebulifer	barred sand bass	46	<1
P. clathratus	kelp bass	43	<1
Sphyraena argentea	California barracuda	35	<1
Medialuna californica	halfmoon	14	<1
Oxyjulis californica	senorita	14	<1
Scorpaena guttata	sculpin	13	<1
			98%

LOCATION: Cabrillo Beach

COUNTY: Los Angeles

47	sample days
3,946	anglers
125	divers
23,562	angler-trip-hours
183	diver-hours
18,591	fishes sampled
105	species identified

Most Commonly Landed Species

Scientific name	Common name	Number landed	% of total
Genyonemus lineatus	white croaker	6,298	34
Scomber japonicus	Pacific mackerel	4,788	26
Seriphus politus	queenfish	874	5
Sarda chiliensis	Pacific bonito	831	4
Scorpaena guttata	sculpin	688	4
Paralabrax clathratus	kelp bass	585	3
Embiotoca jacksoni	black surfperch	514	3
Citharichthys sordidus	Pacific sanddab	492	3
Hadialuna californiensis	halfmoon	465	2
Paralabrax nebulifer	barred sand bass	309	2
			86%

LOCATION: Golden Shore

COUNTY: Los Angeles

47	sample days
3,118	anglers
46	divers
18,757	angler-trip-hours
88	diver-hours
12,453	fishes sampled
84	species identified

Most Commonly Landed Species

Scientific name	Common name	Number landed	% of total
Scomber japonicus	Pacific mackerel	3,986	32
Genyonemus lineatus	white croaker	3,610	29
Sarda chiliensis	Pacific bonito	1,077	9
Seriphus politus	queenfish	489	4
Paralabrax nebulifer	barred sand bass	390	3
P. clathratus	kelp bass	379	3
Embiotoca jacksoni	black surfperch	357	3
Scorpaena guttata	sculpin	271	2
Sebastes serranoides	olive rockfish	256	2
Medialuna californiensis	halfmoon	163	1
			88%

LOCATION: Marine Stadium

COUNTY: Los Angeles

44	sample days
5,728	anglers
79	divers
37,781	angler-trip-hours
170	diver-hours
17,795	fishes sampled
105	species identified

Most Commonly Landed Species

Scientific name	Common name	Number landed	% of total
Scomber japonicus	Pacific mackerel	6,259	35
Genyonemus lineatus	white croaker	3,988	22
Sarda chiliensis	Pacific bonito	1,512	8
Paralabrax nebulifer	barred sand bass	932	5
P. clathratus	kelp bass	653	4
Oxyjulis californica	senorita	447	3
Medialuna californiensis	halfmoon	346	2
Scorpaena guttata	sculpin	334	2
Sphyraena argentea	California barracuda	298	2
Sebastes serranoides	olive rockfish	274	1
			84%

LOCATION: Sunset Aquatic Park

COUNTY: Orange

67	sample days
5,584	anglers
112	divers
34,731	angler-trip-hours
181	diver-hours
13,599	fishes sampled
94	species identified

Most Commonly Landed Species

Scientific name	Common name	Number landed	% of total
Scomber japonicus	Pacific mackerel	4,303	32
Genyonemus lineatus	white croaker	1,761	13
Sarda chiliensis	Pacific bonito	1,583	12
Paralabrax nebulifer	barred sand bass	1,139	8
P. clathratus	kelp bass	422	3
Citharichthys sordidus	Pacific sanddab	365	3
Sebastes paucispinis	bocaccio	307	2
Scorpaena guttata	sculpin	300	2
Sphyraena argentea	California barracuda	297	2
Sebastes chlorostictus	greenspotted rockfish	202	1
			78%

LOCATION: Newport Dunes

COUNTY: Orange

62	sample days
3,880	anglers
172	divers
24,180	angler-trip-hours
222	diver-hours
6,833	fishes sampled
88	species identified

Most Commonly Landed Species

Scientific name	Common name	Number landed	% of total
Scomber japonicus	Pacific mackerel	2,186	32
Sarda chiliensis	Pacific bonito	1,922	28
Genyonemus lineatus	white croaker	502	7
Hinnites multirugosus	rock scallop	279	4
Paralabrax nebulifer	barred sand bass	240	4
P. clathratus	kelp bass	195	3
Semicossyphus pulcher	California sheephead	188	3
P. maculatofasciatus	spotted sand bass	144	2
Citharichthys sordidus	Pacific sanddab	112	2
Sphyraena argentea	California barracuda	102	1
			86%

LOCATION: Bayside

COUNTY: Orange

69	sample days
1,862	anglers
68	divers
11,626	angler-trip-hours
74	diver-hours
3,564	fishes sampled
79	species identified

Most Commonly Landed Species

Scientific name	Common name	Number landed	% of total
Scomber japonicus	Pacific mackerel	1,334	37
Sarda chiliensis	Pacific bonito	567	16
Genyonemus lineatus	white croaker	411	12
Paralabrax nebulifer	barred sand bass	284	8
P. maculatofasciatus	spotted sand bass	162	4
P. clathratus	kelp bass	117	3
Hinnites multirugosus	rock scallop	101	3
Semicossyphus pulcher	California sheephead	86	2
Medialuna californiensis	halfmoon	61	2
Umbrina roncador	yellowfin croaker	32	1
			86%

LOCATION: Davey's Locker

COUNTY: Orange

54	sample days
2,501	anglers
0	divers
17,395	angler-trip-hours
0	diver-hours
2,520	fishes sampled
43	species identified

Most Commonly Landed Species

Scientific name	Common name	Number landed	% of total
Paralabrax maculatofasciatus	spotted sand bass	774	31
P. nebulifer	barred sand bass	560	22
Scomber japonicus	Pacific mackerel	329	13
Umbrina roncador	yellowfin croaker	164	6
Genyonemus lineatus	white croaker	145	6
Paralichthys californicus	California halibut	75	3
Atractoscion nobilis	white seabass	68	3
Sarda chiliensis	Pacific bonito	62	2
Embiotoca jacksoni	black surfperch	47	2
Seriphus politus	queenfish	44	2
			90%

LOCATION: Dana Pt. Launch

COUNTY: Orange

63	sample days
7,580	anglers
253	divers
46,297	angler-trip-hours
388	diver-hours
16,215	fishes sampled
101	species identified

Most Commonly Landed Species

Scientific name	Common name	Number landed	% of total
Scomber japonicus	Pacific mackerel	5,374	33
Sarda chiliensis	Pacific bonito	4,342	27
Genyonemus lineatus	white croaker	1,575	10
Paralabrax nebulifer	barred sand bass	841	5
P. clathratus	kelp bass	724	4
Semicossyphus pulcher	California sheephead	448	3
Seriphus politus	queenfish	423	3
Hinnites multirugosus	rock scallop	336	2
Scorpaena guttata	sculpin	149	1
Haliotis fulgens	green abalone	121	1
			85%

LOCATION: Dana Pt. Hoist (sampled Aug.-Sept. 1981)

COUNTY: Orange

7	sample days
182	anglers
0	divers
1,151	angler-trip-hours
0	diver-hours
252	fishes sampled
10	species identified

Most Commonly Landed Species

Scientific name	Common name	Number landed	% of total
Sarda chiliensis	Pacific bonito	184	73
Scomber japonicus	Pacific mackerel	46	18
			91%

LOCATION: Oceanside

COUNTY: San Diego

55	sample days
2,662	anglers
67	divers
17,157	angler-trip-hours
61	diver-hours
5,896	fishes sampled
79	species identified

Most Commonly Landed Species

Scientific name	Common name	Number landed	% of total
Scomber japonicus	Pacific mackerel	1,496	25
Sarda chiliensis	Pacific bonito	1,274	22
Genyonemus lineatus	white croaker	807	14
Paralabrax clathratus	kelp bass	685	12
P. nebulifer	barred sand bass	328	6
Semicossyphus pulcher	California sheephead	121	2
Scorpaena guttata	sculpin	86	1
Sebastes paucispinis	bocaccio	73	1
S. chlorostictus	greenspotted rockfish	64	1
S. goodei	chilipepper	58	1
			85%

LOCATION: Dana Basin

COUNTY: San Diego

53	sample days
4,208	anglers
692	divers
28,920	angler-trip-hours
746	diver-hours
11,792	fishes sampled
104	species identified

Most Commonly Landed Species

Scientific name	Common name	Number landed	% of total
Scomber japonicus	Pacific mackerel	1,928	16
Haliotis rufescens	red abalone	1,273	11
Sarda chiliensis	Pacific bonito	1,248	11
Paralabrax clathratus	kelp bass	731	6
P. maculatofasciatus	spotted sand bass	671	6
Sebastes paucispinis	bocaccio	549	5
Semicossyphus pulcher	California sheephead	496	4
Seriphus politus	queenfish	369	3
Umbrina roncador	yellowfin croaker	295	3
P. nebulifer	barred sand bass	293	2
			67%

LOCATION: Ski Beach

COUNTY: San Diego

44	sample days
855	anglers
114	divers
5,432	angler-trip-hours
112	diver-hours
2,112	fishes sampled
70	species identified

Most Commonly Landed Species

Scientific name	Common name	Number landed	% of total
Scomber japonicus	Pacific mackerel	568	27
Haliotis rufescens	red abalone	209	10
Sarda chiliensis	Pacific bonito	186	9
Paralabrax maculatofasciatus	spotted sand bass	150	7
Umbrina roncador	yellowfin croaker	97	4
P. clathratus	kelp bass	88	4
Sebastes paucispinis	bocaccio	83	4
Semicossyphus pulcher	California sheephead	57	3
P. neublifer	barred sand bass	53	2
Seriola dorsalis	yellowtail	42	2
			72%

LOCATION: De Anza

COUNTY: San Diego

49	sample days
623	anglers
59	divers
3,907	angler-trip-hours
84	diver-hours
1,298	fishes sampled
59	species identified

Most Commonly Landed Species

Scientific name	Common name	Number landed	% of total
Scomber japonicus	Pacific mackerel	280	22
Sarda chiliensis	Pacific bonito	119	9
Haliotis rufescens	red abalone	91	7
Paralabrax clathratus	kelp bass	75	6
Seriola dorsalis	yellowtail	69	5
Umbrina roncador	yellowfin croaker	55	4
Genyonemus lineatus	white croaker	51	4
Paralabrax nebulifer	barred sand bass	44	3
Sebastes atrovirens	kelp rockfish	36	3
Scorpaena guttata	sculpin	33	3
			66%

LOCATION: Sea Forth Rentals (sampled July-December 1981)

COUNTY: San Diego

26	sample days
609	anglers
0	divers
6,048	angler-trip-hours
0	diver-hours
257	fishes sampled
19	species identified

Most Commonly Landed Species

Scientific name	Common name	Number Landed	% of total
Paralabrax maculatofasciatus	spotted sand bass	55	21
Umbrina roncador	yellowfin croaker	49	19
Sarda chiliensis	Pacific bonito	33	13
Seriphus politus	queenfish	32	13
P. nebulifer	barred sand bass	30	12
Paralichthys californicus	California halibut	17	7
Genyonemus lineatus	white croaker	8	3
Scomber japonicus	Pacific mackerel	6	2
			90%

LOCATION: Shelter Island

COUNTY: San Diego

57	sample days
8,277	anglers
565	divers
61,364	angler-trip-hours
695	diver-hours
22,565	fishes sampled
104	species identified

Most Commonly Landed Species

Scientific name	Common name	Number landed	% of total
Scomber japonicus	Pacific mackerel	3,852	17
Paralabrax nebulifer	barred sand bass	2,464	11
P. maculatofasciatus	spotted sand bass	2,111	9
Sarda chiliensis	Pacific bonito	1,711	8
Genyonemus lineatus	white croaker	1,650	7
Paralabrax clathratus	kelp bass	1,008	4
Seriola dorsalis	yellowtail	938	4
Citharichthys sordidus	Pacific sanddab	908	4
Scorpaena guttata	sculpin	659	3
Haliotis rufescens	red abalone	556	2
			69%

LOCATION: Glorietta Bay

COUNTY: San Diego

42	sample days
439	anglers
69	divers
3,227	angler-trip-hours
75	diver-hours
1,243	fishes sampled
55	species identified

Most Commonly Landed Species

Scientific name	Common name	Number landed	% of total
Scomber japonicus	Pacific mackerel	293	24
Paralabrax nebulifer	barred sand bass	221	18
P. maculatofasciatus	spotted sand bass	165	13
Sarda chiliensis	Pacific bonito	126	10
Haliotis rufescens	red abalone	86	7
Genyonemus lineatus	white croaker	79	6
Semicossyphus pulcher	California sheephead	20	2
Haliotis fulgens	red abalone	17	1
Sebastes serranoides	olive rockfish	16	1
Scorpaena guttata	sculpin	16	1
			83%

LOCATION: Chula Vista

COUNTY: San Diego

62	sample days
982	anglers
18	divers
6,277	angler-trip-hours
24	diver-hours
1,784	fishes sampled
61	species identified

Most Commonly Landed Species

Scientific name	Common name	Number landed	% of total
Paralabrax maculatofasciatus	spotted sand bass	384	21
P. nebulifer	barred sand bass	318	18
Scomber japonicus	pacific mackerel	261	15
Genyonemus lineatus	white croaker	95	5
Scorpaena guttata	sculpin	66	4
Haliotis rufescens	red abalone	53	3
Sarda chiliensis	Pacific bonito	49	3
Seriola dorsalis	yellowtail	40	2
Sebastes paucispinis	bocaccio	35	2
Semicossyphus pulcher	California sheephead	30	2
			75%